VOLUME 7 PART 8

NORTH AMERICAN FLORA

(UREDINALES)

AECIDIACEAE (continuatio)

JOSEPH CHARLES ARTHUR

MICROPUCCINIA (conclusio)

JOSEPH CHARLES ARTHUR AND HERBERT SPENCER JACKSON

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ANNOUNCEMENT

NORTH AMERICAN FLORA is designed to present in one work descriptions of all plants growing, independent of cultivation, in North America, here taken to include Greenland, Central America, the Republic of Panama, and the West Indies, except Trinidad, Tobago, and Curaçao and other islands off the north coast of Venezuela, whose flora is essentially South American.

The work will be published in parts at irregular intervals, by the New York Botanical Garden, through the aid of the income of the David Lydig Fund bequeathed by Charles P. Daly.

It is planned to issue parts as rapidly as they can be prepared, the extent of the work making it possible to commence publication at any number of points. The completed work will form a series of volumes with the following sequence:

Volume 1. Myxomycetes, Schizophyta.

Volumes 2 to 10. Fungi.

Volumes 11 to 13. Algae.

Volumes 14 and 15. Bryophyta.

Volume 16. Pteridophyta and Gymnospermae.

Volumes 17 to 19. Monocotyledones.

Volumes 20 to 34. Dicotyledones.

The preparation of the work has been referred by the Scientific Directors of the Garden to a committee consisting of Dr. N. L. Britton, Dr. W. A. Murrill, and Dr. J. H. Barnhart.

Professor John M. Coulter, of the University of Chicago; Mr. Frederick V. Coville, of the United States Department of Agriculture; and Professor William Trelease, of the University of Illinois, have consented to act as an advisory committee.

Each author will be wholly responsible for his own contributions, being restricted only by the general style adopted for the work, which must vary somewhat in the treatment of diverse groups.

The subscription price is fixed at $1.50 for each part; it is expected that four or five parts will be required for each volume. A limited number of separate parts will be sold at $2.00 each. Address:

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spots, 0.5–2 cm. in diameter, round or oblong, 0.2–1 mm. across, early naked, compact, pulvinate, ruptured epidermis conspicuous; teliospores oblong, ellipsoid, or clavate, 16–26 by 30–42 μ, rounded or obtuse above, rounded or narrowed below, slightly constricted at septum; wall chestnut-brown, rather thick, 1.5–2.5 μ, thicker at apex, 5–9 μ, smooth; pedicel colorless or slightly tinted, about as long as spore.

ON POLYGALACEAE:

Polygala paucifolia Willd., Connecticut, Maine, Michigan, Minnesota, New Hampshire, New York, Wisconsin; Ontario.

TYPE LOCALITY: Cape Elizabeth, Maine, on "*Pyrola*" error for *Polygala paucifolia*.

DISTRIBUTION: Maine and Connecticut westward to Minnesota.

ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 25, f. 89*.

EXSICCATI: Barth. N. Am. Ured. *164, 563;* Ellis N. Am. Fungi *1039;* Ellis & Ev. Fungi Columb. *187;* Seym. & Earle, Econ. Fungi Suppl. *B17;* Shear, N. Y. Fungi *121*.

45. **Micropuccinia Arechavaletae** (Speg.) Arthur & Jackson.

Puccinia Arechavaletae Speg. Anal. Soc. Ci. Argent. **12**: 67. 1881.
Uromyces pervius Speg. Anal. Soc. Ci. Argent. **17**: 94. 1884.
Uromyces aeruginosus Speg. Revista Argent. Hist. Nat. **1**: 20. 1891.
Puccinia Serjaniae Ellis & Ev. Erythea **5**: 6. 1897.
Caeomurus aeruginosus Kuntze, Rev. Gen. 3^3: 449. 1898.
Dicaeoma Arechavaletae Kuntze, Rev. Gen. 3^3: 467. 1898.

O. Pycnia unknown.

III. Telia mostly hypophyllous, loosely grouped or crowded and circinating on yellowish spots 2–5 mm. across, round, 0.1–0.3 mm. in diameter, early naked, loosely pulvinate, chestnut-brown becoming cinereous from germination, ruptured epidermis inconspicuous; telios ores ellipsoid, 15–26 by 20–35 μ, rounded at both ends, not constricted at septum; wall golden- or chestnut-brown, 1.5–3 μ thick, sometimes thickened up to 7 μ at apex, smooth; pedicel colorless, up to three times as long as spore; mesospores very abundant, sometimes almost entirely replacing teliospores, globoid, ellipsoid, or obovoid, 13–23 by 16–26 μ, rounded above, rounded or narrowed below, the wall golden-brown, 2–3 μ thick, sometimes thickened up to 5 μ at apex, smooth, the pedicel colorless or tinted next to spore, up to 60 μ long.

ON SAPINDACEAE:

Cardiospermum coluteoides H.B.K., Guatemala.
Cardiospermum Corindum L., Florida, Texas; Guatemala; Panama; Porto Rico.
Cardiospermum grandiflora Sw., Costa Rica; Guatemala; Panama; Jamaica.
Cardiospermum Halicacabum L., Florida, Texas; Guerrero, Hidalgo, Jalisco, Morelos; Panama; St. Vincent.
Cardiospermum microcarpum H.B.K., Oaxaca, Vera Cruz; Bahamas; Cuba; Porto Rico; Jamaica; Antigua.
Serjania racemosa Schum., Guerrero, Morelos.

TYPE LOCALITY: Montevideo, Argentina, on *Cardiospermum velutinum*.

DISTRIBUTION: Tropical North America from Florida and Texas southward through the West Indies and Central America; also in South America.

ILLUSTRATIONS: Holway, N. Am. Ured. **1**: *pl. 26, f. 92;* Bih. Sv. Vet.-Akad. Handl. **23** (3)[10]: *pl. 4, f. 28*.

EXSICCATI: Barth. N. Am. Ured. *123*.

46. **Micropuccinia Mesnieriana** (Thüm.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Mesnieriana Thüm. Myc. Univ. *834*. 1877.
Puccinia digitata Ellis & Hark. Bull. Calif. Acad. **1**: 27. 1884.
Dicaeoma digitatum Kuntze, Rev. Gen. 3^3: 468. 1898.
Dicaeoma Mesnierianum Kuntze, Rev. Gen. 3^3: 469. 1898.
Dasyspora Mesnieriana Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Coronotelium Mesnierianum Sydow, Ann. Myc. **19**: 174. 1921.

O. Pycnia unknown.

III. Telia mostly hypophyllous, scattered, opposite reddish or brownish spots, round or elliptic, large, 1–4 mm. across, early naked, pulvinate, brownish-black, ruptured epidermis noticeable; teliospores clavate or cylindric, 12–21 by 48–80 μ, with 2–7 digitate projections in a coronate arrangement at apex, rounded or narrowed below, slightly constricted at septum; wall chestnut-brown at apex, lighter below becoming almost colorless in lower cell, 2–3 μ thick, much thickened above, 7–12 μ including projections; pedicel golden- or chestnut-brown, short, up to half length of spore.

This species is correlated with *Dicaeoma Rhamni* (Pers.) Kuntze, the telial characters of the two species being very similar, and the hosts of the short-cycled form corresponding with the aecial hosts of the heteroecious form. This agreement doubtless indicates a common origin for the two species.

ON RHAMNACEAE:

Rhamnus californica Eschsch., California.
Rhamnus crocea Nutt. (*R. insularis* Greene), California.
Rhamnus crocea illicifolia (Kellogg) Greene, California.
TYPE LOCALITY: Coimbra, Portugal, on *Rhamnus Alaternus*.
DISTRIBUTION: California; also in Europe.
ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa 3^2: *pl. 2, f. 13;* Holway, N. Am. Ured. 1: *pl. 26, f. 94.*
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *13a, b;* Barth. Fungi Columb. *4970;* Barth. N. Am. Ured. *1660, 2455;* Ellis, N. Am. Fungi *1466;* Sydow, Ured. *1375.*

47. **Micropuccinia Triumfettae** (Dietel & Holway) Arthur & Jackson.

Puccinia Triumfettae Dietel & Holway; Holway, Bot. Gaz. 24: 30. 1897.

O. Pycnia unknown.

III. Telia mostly hypophyllous, loosely grouped upon yellowish spots 1–10 mm. across, round, 0.1–0.5 mm. in diameter, early naked, pulvinate, golden- or chocolate-brown becoming cinereous from germination, ruptured epidermis inconspicuous; teliospores ellipsoid, oblong, or obovoid, 15–18 by 25–36 μ, rounded above, rounded or narrowed below, slightly constricted at septum; wall light golden-brown, rather thick, 1.5–2.5 μ, thickened at apex, 3–7 μ, smooth; pedicel colorless, up to three times spore-length.

ON TILIACEAE:

Triumfetta semitriloba Jacq., Morelos.
TYPE LOCALITY: Cuernavaca, Mexico, on *Triumfetta semitriloba*.
DISTRIBUTION: Southern Mexico; also in South America.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 26, f. 95.*

48. **Micropuccinia Malvacearum** (Bertero) Arth. & Jackson; Arth. Bull. Torrey Club 48: 41. 1921.

Puccinia Malvacearum Bertero; Mont. in C. Gay, Fl. Chil. 8: 43. 1852.
Dicaeoma Malvacearum Kuntze, Rev. Gen. 3^3: 469. 1898.
Leptopuccinia Malvacearum Rostr. Plantep. Haandb. 268. 1902.
Dasyspora Malvacearum Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia hypophyllous and caulicolous, round, 0.2–1.5 mm. across, scattered over large areas, pulvinate, compact, early naked, at first yellowish-brown, later light chestnut-brown, becoming cinereous by germination, ruptured epidermis not conspicuous except about caulicolous sori; teliospores fusiform or oblong-fusiform, 16–26 by 40–70 μ, acute or obtuse at apex, usually much narrowed below, slightly or not constricted at septum; wall variable in thickness, 1.5–4 μ, smooth, cinnamon-brown, somewhat thickened at apex, 5–10 μ; pedicel once and a half to twice length of spore, colorless, firm, persistent.

ON MALVACEAE:

Althaea ficifolia (L.) Cav., Colorado, New York, Oregon; Ontario.
Althaea rosea (L.) Cav., California, Colorado, Delaware, Illinois, Indiana, Maine, Massachusetts, Michigan, Mississippi, New Hampshire, New Jersey, New York, Ohio, Oregon, Pennsylvania, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin; Ontario.
Lavatera arborea L., California.
Lavatera assurgentiflora Kellogg, California.
Lavatera cretica L. (*L. sylvestris* Brot.), California.
Lavatera maritima Gouan, California.
Lavatera plebeia Sims, California.
Malva borealis Wallm., California.
Malva moschata L., California; Ontario.
Malva oxyloba Boiss., California.
Malva parviflora L., California.
Malva rotundifolia L., Colorado, Connecticut, Delaware, Indiana, Michigan, New Jersey, New York, Oregon, Pennsylvania, Utah, Virginia, Washington, West Virginia, Wisconsin; Ontario.
Malva sylvestris L., California, Colorado, Oregon, West Virginia.
Malva verticillata L. (*M. crispa* L.), California.

Malvastrum corchorifolium (Desv.) Britton, Jamaica.
Malvastrum coromandelianum (L.) Garcke (*M. americanum* Torr., *M. tricuspidatum* A. Gray), Morelos; Cuba; Jamaica; Haïti.
Sida spinosa L., Guatemala.
Sidalcea diploscypha (T. & G.) A. Gray, California.

TYPE LOCALITY: Chile, on *Malvaceae* [*Althaea officinalis*].

DISTRIBUTION: Southeastern Canada, and nearly throughout the United States, southward to southern Mexico and through the West Indies; also nearly throughout the world where hollyhocks are grown.

ILLUSTRATIONS: Beitr. Krypt. Schweiz **2**: *f. 227;* Briosi & Cavara, Funghi Parass. *38, f. 1–3;* Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 3, f. 15a, b;* Corda, Ic. Fung. **6**: *pl. 1, f. 12;* E. & P. Nat. Pfl. **1**[1]**: *f. 45a, b;* Holway, N. Am. Ured. **1**: *pl. 28, f. 99a, b, pl. 29, f. 99c;* Krypt.-fl. Brand. Pilze **3**: *f. B142;* McAlpine, Rusts Austr. *pl. 12, f. 99, 100, pl. 15, f. 123–130, pl. F, f. 28;* Phytopathology **1**: *pl. 12–14;* Grove, Brit. Rust Fungi *f. 154.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *15a, c;* Barth. Fungi Columq. *2361, 2457, 2458, 2767, 2963, 3258, 3559, 3665, 3666, 3947, 3948, 4463, 4758, 4759, 4856, 5065;* Barth. N. Am. Ured. *154, 245, 553, 647, 948, 1162, 1559, 1854, 1952, 2047, 2453, 2551, 2628;* Ellis & Ev. Fungi Columb. *181a, b, 181 (b), 1766;* Garrett, Fungi Utah *105, 165;* Kellerm. Ohio Fungi *31;* Rel. Farl. *260;* Seym. & Earle, Econ. Fungi *1, 267.*

49. **Micropuccinia Sherardiana** (Körn.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Sherardiana Körn. Hedwigia **16**: 19. 1877.
Puccinia Malvastri Peck, Bull. Torrey Club **12**: 35. 1885.
Puccinia Sphaeralceae Ellis & Ev. Am. Nat. **31**: 428. 1897.
Dicaeoma Malvastri Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Sherardiana Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dasyspora Sherardiana Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia amphigenous, few in groups surrounded by telia, or entirely wanting, noticeable, honey-yellow turning to dark-brown, globoid, 95–110 μ in diameter; ostiolar filaments forming a column 80–110 μ high.

III. Telia hypophyllous or caulicolous, round, 0.5–1 mm. in diameter, becoming confluent, and often covering considerable areas, firm, pulvinate, early naked, blackish-brown, becoming cinereous from germination, ruptured epidermis not conspicuous; teliospores ellipsoid, oblong, or obovate, 20–28 by 38–75 μ, rounded or obtuse above, rounded or narrowed below, not or slightly constricted at septum; wall golden- or light cinnamon-brown, 2–4 μ thick, thickened above, 5–10 μ, smooth; pedicel colorless, firm, persistent, up to 200 μ long.

This species is correlated with the heteroecious *Allodus graminella* (Speg.) Arth. and the autoecious *Allodus interveniens* (Peck) Bethel, the morphological characters of like stages in the three species being similar or identical, and there being a significant correspondence in hosts. This agreement doubtless indicates a common origin for the three species.

ON MALVACEAE:

Althaea rosea (L.) Cav., California.
Sidalcea oregana (Nutt.) A. Gray, Colorado, Washington.
Sidalcea spicata Greene, California.
Sidalcea virgata Howell, Oregon.
Sphaeralcea ambigua A. Gray, Nevada.
Sphaeralcea angustifolia (Cav.) G. Don, New Mexico, Texas; Coahuila, Hidalgo, Mexico (state).
Sphaeralcea arcuata (Greene) Arth. (*Malvastrum arcuatum* B. L. Robinson), California.
Sphaeralcea arenaria Wooton & Standley, New Mexico, Texas.
Shpaeralcea arizonica A. Heller, Utah.
Sphaeralcea coccinea (Nutt.) Rydb. (*Malvastrum coccineum* A. Gray), Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Wyoming; Alberta, Saskatchewan.
Sphaeralcea cuspidata (A. Gray) Britton, Arizona, Colorado.
Sphaeralcea dissecta (Nutt.) Rydb. (*Malvastrum dissectum* A. Nelson, *M. dissectum Cockerellii* A. Nelson), Colorado, Utah.
Sphaeralcea elata (Baker f.) Rydb. (*Malvastrum elatum* A. Nelson), Colorado, New Mexico.
Sphaeralcea fasciculata (Nutt.) Arth. (*Malvastrum fasciculatum* Greene, *M. Thurberi* A. Gray, *M. splendidum* Kellogg), California.
Sphaeralcea Fendleri A. Gray, Arizona, New Mexico.
Sphaeralcea incana Torr., New Mexico.
Sphaeralcea lobata Wooton, New Mexico, Texas.
Sphaeralcea marginata York, Arizona, Colorado, New Mexico, Utah.
Sphaeralcea Munroana (Dougl.) Spach (*Malvastrum Munroanum* A. Gray), Idaho, Utah, Washington.
Sphaeralcea subrhomboidea Rydb., Utah.

TYPE LOCALITY: Armenia, on *Malva Sherardiana.*

DISTRIBUTION: Semi-arid plains and mountains from Alberta and North Dakota southward through Mexico; also in South America and Asia.

ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 27, f. 98a–c, pl. 28, f. 98d–g.*
EXSICCATI: Barth. Fungi Columb. *2467, 3370, 3768;* Barth. N. Am. Ured. *367, 568, 967, 1172, 1174, 1270, 1470, 1775, 2469, 2633;* Brenckle, Fungi Dak. *66;* Carleton, Ured. Am. *2;* Clements, Crypt. Form. Colo. *324;* Ellis & Ev. Fungi Columb. *256, 1182;* Ellis & Ev. N. Am. Fungi *3478;* Garrett, Fungi Utah. *168, 222;* D. Griff. W. Am. Fungi *24;* Seym. & Earle, Econ. Fungi Suppl. *B16;* Sydow, Ured. *775, 1276, 2078, 2277.*

50. **Micropuccinia Sidalceae** (Holway) Arthur & Jackson.

Puccinia Sidalceae Holway, N. Am. Ured. 1: 67. 1907.

O. Pycnia unknown.

III. Telia hypophyllous and petiolicolous, round, 0.5–1 mm. across, or elongate to 2 cm. when petiolicolous, scattered, or more or less circinate in small groups, firm, pulvinate, tardily naked, at first cinnamon-brown, becoming blackish, ruptured epidermis persistent and conspicuous; teliospores ellipsoid or oblong, variable in size, 23–32 by 38–48 μ, rounded above and below, not constricted at septum; wall cinnamon- or chestnut-brown, 3–5 μ thick, becoming gradually thicker toward apex up to 8 μ, smooth; pedicel fragile, slender, twice to thrice length of spore, usually broken away, colorless.

ON MALVACEAE:

Sidalcea glaucescens Greene, California.
Sidalcea malvaeflora (Moc. & Sessé) A. Gray, California.
Sidalcea oregana (Nutt.) A. Gray, California, Oregon.
Sidalcea spicata Greene, California, Oregon.

TYPE LOCALITY: Klamath County, Oregon, on *Sidalcea oregana.*
DISTRIBUTION: Southern Oregon to central California.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 29, f. 100.*
EXSICCATI: Barth. N. Am. Ured. *2470;* Sydow, Ured. *1782.*

51. **Micropuccinia heterospora** (Berk. & Curt.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia heterospora Berk. & Curt. Jour. Linn. Soc. **10**: 356. 1868.
Uromyces pulcherrimus Berk. & Curt. Grevillea **3**: 56. 1874.
Uromyces Thwaitesii Berk. & Br. Jour. Linn. Soc. **14**: 92. 1875.
Uromyces Sidae Thüm. Rev. Myc. **1**: 10. 1879.
Uromyces pictus Thüm. Rev. Myc. **1**: 10. 1879.
Uromyces Malvacearum Speg. Anal. Soc. Ci. Argent. **12**: 72. 1881.
Puccinia Thwaitesii Wint. Hedwigia **22**: 130. 1883.
Uromyces malvicola Speg. Anal. Soc. Ci. Argent. **17**: 94. 1884.
Puccinia heterospora pulcherrima Lagerh. Tromsö Mus. Aarsh. **17**: 61. 1895.
Caeomurus Malvacearum Kuntze, Rev. Gen. 3^3: 450. 1898.
Caeomurus malvicola Kuntze, Rev. Gen. 3^3: 450. 1898.
Caeomurus pictus Kuntze, Rev. Gen. 3^3: 450. 1898.
Caeomurus Sidae Kuntze, Rev. Gen. 3^3: 450. 1898.
Dicaeoma pulcherrimum Kuntze, Rev. Gen. 3^3: 467. 1898.
Dicaeoma Thwaitesii Kuntze, Rev. Gen. 3^3: 470. 1898.
Uromyces Pavoniae Arth. Bull. Torrey Club **31**: 1. 1904.
Telospora Pavoniae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dasyspora heterospora Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown, probably not formed.

III. Telia chiefly hypophyllous, small, 0.2–0.5 mm. across, scattered, or more commonly gregarious, and occasionally confluent in more or less circular groups of few to many sori on yellowish spots reaching 1.5 cm. in diameter, early naked, firm, pulvinate, blackish-brown, central sori occasionally cinereous from germination, ruptured epidermis not conspicuous; teliospores with septum few, or entirely wanting in some collections, ellipsoid or globoid, 16–28 by 18–36 μ, rounded above and below, not constricted at septum, which is often oblique; wall chestnut-brown, 2–2.5 μ thick, thickened at apex or opposite pedicel 5–7 μ, smooth; pedicel colorless, firm, once to twice length of spore, often attached laterally, frequently at septum; mesospores numerous, usually predominating, often to exclusion of two-celled teliospores, globoid or obovoid, 16–24 by 18–32 μ, rounded above, rounded or narrowed below, the wall 1.5–3 μ thick, thickened above, 5–7μ, chestnut-brown, smooth, the pedicel colorless, firm, two to five times length of spore.

This species is correlated with *Nigredo Epicampis* (Dietel & Holway) Arth. and *Dicaeoma hibisciatum* (Schw.) Arth., the telial characters of the three species bearing a very remarkable similarity, and the hosts of the short-cycled form corresponding with the aecial hosts of the *Dicaeoma*, those of the *Ni redo* not being positively known. This agreement doubtless indicates a common origin for the three species.

ON MALVACEAE:

Abutilon abutiloides (Jacq.) Garcke (*A. Jacquinii* G. Don, *A. lignosum* Rich. not G. Don), Jalisco, Zacatecas; Cuba.
Abutilon Abutilon (L.) Rusby (*A. Avicennae* Gaertn., *A. Theophrasti* Medic.), District of Columbia, Kansas, Missouri, Nebraska.
Abutilon Berlandieri A. Gray, Hidalgo.
Abutilon discissum (Bertero) Schlecht., Guatemala.
Abutilon Hemsleyanum Rose (*A. sidoides* Hemsl. not Dalz. & Gibs.), Jalisco, San Luis Potosí.
Abutilon hirtum (Lam.) Sweet, Puebla; Cuba; Jamaica; St. Croix; Porto Rico.
Abutilon holosericeum Scheele, Texas.
Abutilon Holwayi Rose, Oaxaca.
Abutilon incanum (Link) Sweet, Arizona, Texas; Sonora.
Abutilon indicum (L.) Sweet, Cuba; Jamaica; Barbados.
Abutilon parvulum A. Gray, Arizona.
Abutilon pauciflorum St.-Hil., Jamaica.
Abutilon permolle (Willd.) Sweet, Cuba.
Abutilon texense T. & G., Texas.
Abutilon sp., Morelos.
Anoda acerifolia Zucc., Morelos, Oaxaca, Veracruz.
Anoda hastata Cav., Aguascalientes, Hidalgo, Jalisco, Michoacan, Morelos, Oaxaca; Cuba.
Anoda lavateroides Medic., Jalisco, Yucatan.
Gaya occidentalis (L.) Sweet, Cuba, Santo Domingo.
Gayoides crispum (L.) Small (*Abutilon crispum* Sweet), Arizona, Florida; Bahamas.
Gayoides imberbe (Griseb.) Small (*Abutilon imberbe* G. Don), Florida.
Malache scabra B. Vogel (*Pavonia racemosa* Sw.), Jamaica, Panama; Porto Rico.
Malva sylvestris L., Kansas.
Malvastrum coromandelianum (L.) Garcke (*M. americanum* Torr., *M. tricuspidatum* A. Gray), Texas.
Malvaviscus arboreus Cav., Costa Rica; Guatemala.
Periptera Periptera (Sims) Rose (*Anoda incarnata* H.B.K. not Spreng.), Jalisco.
Sida aucta Burm., Haïti.
Sida cordifolia L., Guatemala.
Sida glutinosa Commerson, Cuba; Jamaica; Porto Rico.
Sida hastata.St.-Hil., Texas.
Sida hederifolia Cav., Porto Rico.
Sida Holwayi Baker & Rose, Morelos.
Sida humilis Cav., Porto Rico; St. Thomas.
Sida physocalyx A. Gray, Arizona, Texas.
Sida procumbens Sw., Cuba; Mona Island; Porto Rico.
Sida salviaefolia Presl, Sinaloa.
Sida spinosa L., Georgia, Illinois, Indiana, Kentucky, Louisiana, Mississippi; Cuba; Porto Rico.
Sida supina L'Hér., Porto Rico; St. Thomas.
Sida texana (T. & G.) Small (*S. Elliottii texana* T. & G., *S. Lindheimeri* Engelm. & Gray), Texas.
Sida urens L., Cuba; Jamaica; Porto Rico.
Sida sp., Jalisco.
Wissadula amplissima (L.) R. E. Fries, Texas.
Wissadula Fadyenii R. E. Fries, Jamaica.
Wissadula periplocifolia (L.) Thwaites (*Abutilon periplocifolium* G. Don), Texas; Cuba; Jamaica; Porto Rico; St. Croix.
Wissadula rostrata (Schum. & Thonn.) Planch., Colima.

TYPE LOCALITY: Cuba, on "leaves apparently of some malvaceous plant."

DISTRIBUTION: Nevada to southern Nebraska and District of Columbia, southward through Central America and the West Indies; also in South America, Asia, Africa, Hawaii, and the Philippines.

ILLUSTRATIONS: Ber. Deuts. Bot. Ges. **9**: *pl. 9, f. 1–16;* Holway, N. Am. Ured. **1**: *pl. 27, f. 97;* Jour. Myc. **7**: *pl. 10, f. 1–5;* McAlpine, Rusts Austr. *pl. 12, f. 101;* Bot. Gaz. **28**: 419, *f. 1.*

EXSICCATI: Barth. N. Am. Ured. *39, 148, 240, 345, 1157, 1158, 1655, 2447;* Barth. Fungi Columb. *2358, 2453, 2454, 4667;* Carleton, Ured. Am. *48;* Ellis & Ev. Fungi Columb. *550, 1455;* Ellis & Ev. N. Am. Fungi *2413;* Kellerm. Fungi Sel. Guat. *6;* Pringle, Mex. Fungi *1, 2;* Seym. & Earle, Econ. Fungi *269, 269a;* Sydow, Ured. *367, 428, 2029, 2067.*

52. **Micropuccinia lobata** (Berk. & Curt.) Arthur & Jackson.

Puccinia lobata Berk. & Curt. Grevillea **3**: 54. 1874.
Dicaeoma lobatum Kuntze, Rev. Gen. **3**^{3}: 469. 1898.
Puccinia Streptanthi Höhnel, Sitz.-ber. Akad. Wien **118**: 1461. 1909.

O. Pycnia unknown.

III. Telia chiefly hypophyllous, rarely epiphyllous, small, round, 0.3–0.8 mm. across, crowded in more or less orbicular groups 1–10 mm. across, or occasionally scattered singly or in groups of two or more sori, compact, early naked, blackish, becoming cinereous from germination of central sori, ruptured epidermis not conspicuous; teliospores broadly ellipsoid, oblong or obovate, 16–22 by 30–45 μ, rounded above, rounded or occasionally narrowed

below, not constricted at septum; wall golden- or chestnut-brown, usually thick, 1.5–3.5 μ, thickened above, 5–10 μ, often breaking into few irregular points in germinating, smooth; pedicel colorless, 75–120 μ long, or shorter.

ON MALVACEAE:

Althaea rosea (L.) Cav., New Mexico; Mexico (state).
Disella hederacea (Dougl.) Greene (*Sida hederacea* Torr.), Arizona, California, New Mexico, Texas, Utah.
Disella lepidota (A. Gray) Greene (*Sida lepidota* A. Gray), New Mexico, Texas.
Sphaeralcea Orcuttii Rose, California.
Sphaeralcea sp., Arizona.

TYPE LOCALITY: Texas, on *Sida lepidota*.
DISTRIBUTION: Western Texas to central California, and southward to southern Mexico.
ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 27, f. 96a, b.*
EXSICCATI: Barth. N. Am. Ured. *2451;* Garrett, Fungi Utah. *164.*

53. **Micropuccinia Anodae** (Sydow) Arthur & Jackson.

Puccinia Anodae Sydow, Monog. Ured. **1**: 475. 1903.

O. Pycnia unknown.

III. Telia hypophyllous, small, round, 0.5–0.8 mm. across, scattered, or gregarious and confluent in small groups 1–2 mm. across, early naked, pulvinate, cinnamon- or chestnut-brown, becoming cinereous from germination, ruptured epidermis not conspicuous; teliospores ellipsoid or obovate, 18–22 by 32–40 μ, rounded above, rounded or narrowed below, not constricted at septum; wall golden-brown, 2–3 μ thick, thickened above, 7–9 μ, smooth; pedicel colorless, persistent, as long as spore.

ON MALVACEAE:

Anoda acerifolia DC., Veracruz.
Anoda hastata Cav., Costa Rica; Guatemala.

TYPE LOCALITY: San Miguel Uspantan, Guatemala, on *Anoda hastata*.
DISTRIBUTION: Southern Mexico through Central America; also in South America.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 28, f. 391.*
EXSICCATI: Sydow, Ured. *2609.*

54. **Micropuccinia exilis** (Sydow) Arthur & Jackson.

Puccinia exilis Sydow, Monog. Ured. **1**: 481. 1903.

O. Pycnia unknown.

III. Telia hypophyllous, small, 0.5–0.8 mm. in diameter, scattered, or in gregarious and confluent groups 1–3 mm. across, compact, pulvinate, cinnamon-brown, becoming cinereous from germination; teliospores oblong or oblong-clavate, 13–16 by 26–35 μ, rounnded above, rounded or narrowed below, not or slightly constricted at septum; wall yellowish, thin, 1–2 μ, not or slightly thickened above, 3–4 μ, the thickening disappearing upon germination, smooth; pedicel colorless, fragile, twice to thrice length of spore.

ON MALVACEAE:

Pavonia rosea Schlecht., Guatemala.

TYPE LOCALITY: Brazil, on *Pavonia leucantha.*
DISTRIBUTION: Quirigua, Guatemala; also in South America.
ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 29, f. 396.*

55. **Micropuccinia filopes** (Arth. & Holway) Arthur & Jackson.

Puccinia filopes Arth. & Holway; Arth. Mycologia **10**: 131. 1918.

O. Pycnia unknown.

III. Telia chiefly hypophyllous, crowded or confluent in circular areas 2–5 mm. across, on larger discolored spots, round, 0.1–0.3 mm. in diameter, early naked, pulvinate, golden-brown becoming cinereous by germination, ruptured epidermis inconspicuous; teliospores oblong-obovoid, 13–16 by 30–40 μ, rounded above, somewhat narrowed below, slightly constricted at septum; wall pale golden-brown, sometimes lighter below, 1–1.5 μ thick, slightly or not thickened at apex, smooth; pedicel colorless, once to twice length of spore, slender, 7–9 μ in diameter next to spore, tapering downward.

ON STERCULIACEAE:
Buettneria carthaginensis Jacq., Costa Rica.
Buettneria lateralis Presl, Guatemala.
Buettneria sp., Panama.
TYPE LOCALITY: Escuintla, Guatemala, on *Buettneria lateralis*.
DISTRIBUTION: Central America.

56. **Micropuccinia hiascens** (Arth.) Arthur & Jackson.

Puccinia aucta Arth. & Holway; Arth. Am. Jour. Bot. 5: 475. 1918. Not *P. aucta* Berk. & Müll., 1872.
Puccinia hiascens Arth. Bull. Torrey Club 46: 471. 1920.

O. Pycnia unknown.

III. Telia hypophyllous, crowded in small mostly confluent groups 0.5–2 mm. across, on somewhat larger purple spots, round, 0.1–0.5 mm. in diameter, early naked, pulvinate, chocolate-brown, ruptured epidermis inconspicuous; teliospores oblong, 10–15 by 32–42 μ, rounded or obtuse at both ends, or often narrowed below, somewhat constricted at septum; wall light chestnut-brown or lighter after germination, 1.5–2 μ thick, much thickened above, 3–10 μ, smooth; pedicel light-brown or colorless, once to twice length of spore or shorter, persistent.

ON DILLENIACEAE:
Saurauja Conzattii Busc., Guatemala.
Saurauja Smithiana Busc., Guatemala.
TYPE LOCALITY: Road between Colomba and Quezaltenango, Guatemala, on *Saurauja Smithiana*.
DISTRIBUTION: Guatemala.

57. **Micropuccinia Fergussoni** (Berk. & Br.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Fergussoni Berk. & Br. Ann. Nat. Hist. IV. **15**: 35. Ja 1875.
Puccinia nidificans Magn. Hedwigia **14**: 20. F 1875.
Dicaeoma Fergussoni Kuntze, Rev. Gen. 3^3: 468. 1898.
Dasyspora Fergussoni Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia amphigenous, chiefly hypophyllous and petiolicolous on yellowish spots, small, 0.2–0.5 mm. across, round, closely gregarious in more or less circular groups 0.2–1 cm. across, somewhat tardily naked, chestnut-brown, ruptured epidermis noticeable; teliospores somewhat irregularly ellipsoid, oblong, or clavate, 13–18 by 26–42 μ, rounded or obtuse above, rounded or more commonly narrowed below, slightly or not constricted at septum; wall cinnamon-brown, 1.5–2.5 μ thick, thicker above, 3–7 μ, smooth; pedicel short, deciduous.

ON VIOLACEAE:
Viola Langsdorfii Fisch., British Columbia.
Viola Macloskeyi F. E. Lloyd, British Columbia.
Viola neprophylla Greene (*V. cognata* Greene), Utah; British Columbia.
Viola palustris L., Alaska, Colorado, Montana.
TYPE LOCALITY: New Pitsligo, Scotland, on *Viola palustris*.
DISTRIBUTION: High mountains of northern Colorado and Utah, northwestward to southeastern Alaska; also in Europe.
ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 29, f. 102;* Grove, Brit. Rust Fungi *f. 151*.
EXSICCATI: Barth. N. Am. Ured. *1542;* Garrett, Fungi Utah. *53*.

58. **Micropuccinia ornatula** (Holway) Arthur & Jackson.

Puccinia ornatula Holway, N. Am. Ured. 1: 67. 1907.

O. Pycnia unknown.

III. Telia chiefly hypophyllous, occasionally epiphyllous, small, round, 0.2–0.5 mm. across, usually gregarious but rarely coalescing, early naked, punctiform, becoming pulverulent, chestnut-brown, surrounding epidermis persistent and conspicuous; teliospores angularly ellipsoid, fusiform, or oblong, 16–22 by 26–44 μ, rounded or obtuse above, rounded or narrowed below, not constricted at septum; wall dark cinnamon-brown, uniformly thin, 1–2 μ, smooth, except for two to four obscure longitudinal lines of fine papillae, the pores covered by an abrupt hyaline umbo, that of upper cell at apex or at one side, that of lower cell at septum or depressed half way; pedicel colorless, fragile, as long as spore, or more commonly deciduous.

ON VIOLACEAE:

Viola canadensis L., British Columbia.
Viola glabella Nutt., British Columbia.
Viola rugulosa Greene, British Columbia.

TYPE LOCALITY: Alpine meadow, Glacier, British Columbia, on *Viola canadensis*.
DISTRIBUTION: Vicinity of Glacier, British Columbia.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 29, f. 101a, b.*

59. **Micropuccinia canadensis** (Arth.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia canadensis Arth. Bull. Torrey Club **31**: 2. 1904.
Dasyspora canadensis Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia amphigenous, round, 0.5–1 mm. across, gregarious and frequently confluent, soon naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores narrowly oblong or oblong-linear, 12–16 by 30–56 μ, obtuse at both ends, noticeably constricted at septum; wall cinnamon-brown, 1–2 μ thick, slightly thickened above, 3–6 μ, minutely verrucose, the tubercles in irregular longitudinal rows; pedicel colorless, delicate, short, or as long as spore.

ON VIOLACEAE:

Viola orbiculata Geyer, Alberta, British Columbia.

TYPE LOCALITY: Laggan, Alberta, on *Viola orbiculata*.
DISTRIBUTION: High mountains of western Canada.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 29, f. 103.*

60. **Micropuccinia Cupheae** (Holway) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Cupheae Holway, Ann. Myc. 2: 393. 1904.
Puccinia jaliscensis Holway, Ann. Myc. 2: 393. 1904.
Dasyspora jaliscensis Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, crowded on reddish or brownish spots 1.5–6 mm. across, round, 0.1–0.8 mm. in diameter, early naked, pulvinate, dark chestnut-brown, ruptured epidermis rather inconspicuous; teliospores cylindric, clavate, or ellipsoid, variable in size, 15–23 by 32–74 μ, rounded or obtuse above, rounded or narrowed below, slightly constricted at septum; wall golden- or chestnut-brown above, lighter below, 1–2 μ thick, thickened at apex, 5–10 μ, smooth; pedicel slightly tinted or colorless, about length of spore.

ON LYTHRACEAE:

Cuphea aequipetala Cav., Mexico (state).
Cuphea cyanaea Moc. & Sessé, Oaxaca.
Cuphea Hookeriana Walp., Jalisco; Guatemala.
Cuphea nitidula H.B.K., Oaxaca.
Cuphea procumbens Cav., Mexico (state).
Cuphea squamuligera Koehne, Morelos.

TYPE LOCALITY: Valley of Mexico, Mexico, on *Cuphea* [*aequipetala*].
DISTRIBUTION: Southern Mexico and Guatemala.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 32, f. 106, 107.*
EXSICCATI: Barth. Fungi Columb. *4956;* Barth. N. Am. Ured. *430;* Sydow, Ured. *1877.*

61. **Micropuccinia Circaeae** (Pers.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Circaeae Pers. Neues Mag. Bot. **1**: 119. 1794.
Dicaeoma Circaeae Kuntze, Rev. Gen. 3^3: 468. 1898.
Dasyspora Circaeae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Leptopuccinia Circaeae Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown.

III. Telia mostly hypophyllous or caulicolous, crowded, sometimes circinating on reddish or yellowish spots 2–5 mm. across, round, 0.1–0.3 mm. in diameter, early naked, pulvinate, sometimes pulverulent on stems, yellowish or dark cinnamon-brown becoming cinereous from germination, ruptured epidermis inconspicuous; teliospores ellipsoid, oblong, or fusiform-oblong, 10–16 by 24–39 μ, rounded or narrowed above and below, constricted at septum;

wall golden-brown or pale-yellowish, sometimes almost colorless, 1–1.5 μ thick, thickened at apex, 3–9 μ, smooth; pedicel colorless, up to 40 μ long.

ON ONAGRACEAE:

Circaea alpina L., Alaska, Colorado, Michigan, Minnesota, Montana, New Hampshire, New York, Pennsylvania, West Virginia, Wisconsin; Newfoundland; Nova Scotia, Ontario.

Circaea lutetiana L. (*C. canadensis* Muhl., *C. latifolia* Hill), Connecticut, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New York, Ohio, Pennsylvania, North Carolina, North Dakota, Virginia, West Virginia, Wisconsin; Nova Scotia, Ontario, Quebec.

Circaea pacifica Asch. & Magn., Alaska, California, Colorado, Idaho, Montana, Oregon, Utah, Washington; British Columbia.

TYPE LOCALITY: Europe, on *Circaea lutetiana*.

DISTRIBUTION: North Carolina to northern Mississippi and Utah, and northward to Alaska and Newfoundland; also in Europe and southern Asia.

ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 1, f. 2a, b;* Corda, Ic. Fung. **4**: *pl. 3, f. 34;* Holway, N. Am. Ured. **1**: *pl. 36, f. 118a, b.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *2a, b;* Barth. Fungi Columb. *2352, 2659, 3252, 4259, 4456, 4845, 5052;* Barth. N. Am. Ured. *130, 336, 830, 933, 1142, 1749, 2235;* Brenckle, Fungi Dak. *487;* Ellis, N. Am. Fungi *250, 1030;* Ellis & Ev. Fungi Columb. *483, 1286;* Garrett, Fungi Utah. *229;* Kellerm. Ohio Fungi *29;* Rel. Farl. *248;* Sydow, Ured. *1015, 1118;* Thüm. Myc. Univ. *1330.*

62. **Micropuccinia Fuchsiae** (Sydow & Holway) Arthur & Jackson.

Puccinia Fuchsiae Sydow & Holway; Sydow, Ann. Myc. **4**: 30. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, crowded opposite reddish spots 1–4 mm. in diameter, round or oblong, 0.2–0.8 mm. across, early naked, pulvinate, yellowish or dark cinnamon-brown becoming cinereous from germination, ruptured epidermis rather inconspicuous; teliospores oblong, ellipsoid, or clavate, 13–18 by 34–45 μ, rounded above, rounded or narrowed below, somewhat constricted at septum; wall pale-yellow or pale golden-brown, 1–1.5 μ thick, thickened at apex, 3–7 μ, smooth; pedicel colorless, one half to once length of spore.

ON ONAGRACEAE:

Fuchsia microphylla H.B.K., Guatemala.

Fuchsia thymifolia H.B.K., Mexico (state).

Lopezia hirsuta Jacq., Costa Rica; Guatemala; Panama.

TYPE LOCALITY: Amecameca, Mexico, on *Fuchsia thymifolia*.

DISTRIBUTION: Southern Mexico and Central America.

ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 36, f. 119.*

EXSICCATI: Sydow, Ured. *1976.*

63. **Micropuccinia gigantea** (P. Karst.) Arthur & Jackson.

Puccinia gigantea P. Karst. Bidr. Finl. Nat. Folk **31**: 42. 1879.
Dicaeoma giganteum Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Puccinia annulata Ellis & Ev. Bull. Torrey Club **27**: 60. 1900.
Puccinia pileata Mayor, Bull. Soc. Neuch. Sci. Nat. **29**: 67. 1901.

O. Pycnia unknown.

III. Telia hypophyllous or caulicolous, crowded opposite reddish or brownish, slightly hypertrophied spots 1–3 mm. in diameter, or up to 13 mm. on stems, round or oblong, 0.5–1.5 mm. across, early naked, pulvinate, dark chocolate-brown, ruptured epidermis conspicuous; teliospores cylindric or cylindric-clavate, 10–17 by 32–58 μ, rounded or acute above, sometimes slightly narrowed below; wall golden-brown or chestnut-brown above, 1–1.5 μ thick, considerably thickened at apex, 6–12 μ, smooth; pedicel colorless, up to 50 μ long.

ON ONAGRACEAE:

Chamenerion spicatum (Lam.) S. F. Gray (*C. angustifolium* Scop., *Epilobium angustifolium* β L.), Montana; Alberta.

TYPE LOCALITY: Jakobstad, Lapland, on *Epilobium angustifolium*.

DISTRIBUTION: Mountains of western Montana to southern Alberta; also in Europe.

64. **Micropuccinia Epilobii** (DC.) Rostr. Medd. Grønland 30: 114. 1904.

Puccinia Epilobii DC. Fl. Fr. **6**: 61. 1815.
Dicaeoma Epilobii Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dasyspora Epilobii Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, scattered over the entire lower surface of leaf, arising from a diffused mycelium, ellipsoid or oblong, 0.5–1 mm. long, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; teliospores ellipsoid or oblong, 18–23 by 30–42 μ, rounded at both ends, deeply constricted at septum; wall yellowish-brown, rather thick, 1.5–2.5 μ, sometimes up to 3 μ over pores, minutely and closely verrucose; pedicel colorless or pale-yellow, fragile, up to 25 μ long; mesospores few, ellipsoid, 20–23 by 24–35 μ.

This species is correlated with *Nigredo plumbaria* (Peck) Arth. and *Dicaeoma Epilobii-tetragoni* (DC.) Arth., both autoecious species, there being close similarity in the morphological characters of the telia in the three species, and a significant correspondence in the hosts. This agreement doubtless indicates a common origin for the three species.

ON ONAGRACEAE:

Epilobium alpinum L., Wyoming; Quebec.
Epilobium Hornemannii Reichenb. (*E. alsinifolium* Blytt), Greenland.

TYPE LOCALITY: In vicinity of Quériqut, Pyrenees, France, on *Epilobium origanifolium*.

DISTRIBUTION: Mountains of northwestern Wyoming, and from the mouth of the St. Lawrence River to western Greenland; also in Europe.

ILLUSTRATIONS: Beitr. Krypt. Schweiz **2**[2]: *f. 120;* Holway, N. Am. Ured. **1**: *pl. 33, f. 110a, b;* Krypt.-fl. Brand. Pilze **3**: *f. B19;* Grove, Brit. Rust Fungi *f. 148*.

65. **Micropuccinia scandica** (Johans.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia scandica Johans. Bot. Notiser **1886**: 175. 1886.
Dicaeoma scandicum Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dasyspora scandica Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, covering the leaf, crowded, round, 0.3–0.8 mm. in diameter, early naked, pulverulent, somewhat pulvinate, dark cinnamon-brown, ruptured epidermis evident; teliospores oblong or clavate, 13–17 by 27–38 μ, rounded above, rounded or narrowed below, moderately or deeply constricted at septum; wall cinnamon-brown, 1–2 μ thick, thickened into a lighter umbo at apex, 3–5 μ, closely and finely verrucose; pedicel colorless, fragile, up to 40 μ long.

ON ONAGRACEAE:

Epilobium clavatum Trel., Utah, Washington.
Epilobium sp., British Columbia.

TYPE LOCALITY: Jemtland, Sweden, on *Epilobium anagallidifolium*.
DISTRIBUTION: From central Utah northwestward into Canada; also in Sweden.
ILLUSTRATION: Holway, N. Am. Ured. **1**: *pl. 33, f. 111.*
EXSICCATI: Garrett, Fungi Utah. *84, 140;* Sydow, Ured. *1940, 2038*.

66. **Micropuccinia Araliae** (Ellis & Ev.) Arthur & Jackson.

Puccinia Araliae Ellis & Ev. Jour. Myc. **6**: 120. 1891.
Dicaeoma Araliae Kuntze, Rev. Gen. **3**[3]: 467. 1898.

O. Pycnia unknown.

III. Telia mostly hypophyllous, crowded on somewhat hypertrophied spots 1–3 mm. in diameter, round or oblong, 0.3–0.5 mm. across, soon naked, slightly pulverulent, light chocolate-brown, ruptured epidermis conspicuous; teliospores oblong, 16–23 by 30–38 μ, rounded or obtuse at both ends, not or slightly constricted at septum; wall dark cinnamon-brown, thin, 1–1.5 μ, smooth except for a few irregular lines of verrucose markings; pedicel colorless, fragile, about as long as spore.

ON ARALIACEAE:

Panax trifolium L., Massachusetts.
TYPE LOCALITY: [Boston], Massachusetts, on *Panax trifolium*.
DISTRIBUTION: Known only from the type locality.
ILLUSTRATIONS: Holway, N. Am. Ured. 1: *pl. 37, f. 121.*

67. **Micropuccinia Cryptotaeniae** (Peck) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Cryptotaeniae Peck, Bull. Buffalo Soc. Nat. Sci. **1**: 66. 1873.
Puccinia Astrantiae Berk. & Curt. Grevillea **3**: 52. 1874. Not *P. Astrantiae* Kalchbr. 1865.
Dicaeoma Astrantiae Kuntze, Rev. Gen. 3^3: 468. 1898.
Dicaeoma Cryptotaeniae Kuntze, Rev. Gen. 3^3: 468. 1898.
Allodus Cryptotaeniae Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.

O. Pycnia amphigenous, numerous, preceding or among the telia, punctiform, dark-brown, depressed-globoid, small, 65–80 μ broad by 50–65 μ high; ostiolar filaments up to 45 μ long.

III. Telia amphigenous, chiefly hypophyllous and caulicolous, scattered singly or more commonly in irregular groups of few to many sori, often following the veins, petioles, and stems, small, round, 0.2–0.5 mm. across, standing well out from surface of leaf, opening tardily by a central pore, chestnut-brown, becoming somewhat pulverulent with age, ruptured epidermis cinereous, persistent and conspicuous; teliospores somewhat irregularly ellipsoid, oblong, or fusiform, 14–20 by 28–46 μ, rounded or obtuse above, rounded or narrowed below, not or very slightly constricted at septum; wall cinnamon-brown, uniformly thin, 1.5–2 μ, with abrupt hyaline papilla at apex and over pore of lower cell at septum, smooth; pedicel colorless, fragile, as long as spore, or more commonly deciduous.

This species is correlated with *Allodus microica* (Ellis) Orton, the telial characters being practically identical, and the hosts being the same. The two forms are closely related, having undoubtedly had a common origin.

ON AMMIACEAE:

Deringa canadensis (L.) Kuntze (*Cryptotaenia canadensis* DC.), Connecticut, Delaware, Iowa, Massachusetts, New Jersey, New York, Pennsylvania, Wisconsin; Canada.
TYPE LOCALITY: North Greenbush, New York, on *Cryptotaenia canadensis*.
DISTRIBUTION: Delaware northward to southeastern Canada and westward to northern Iowa.
ILLUSTRATIONS: Ann. Rep. N. Y. State Mus. **25**: *pl. 2, f. 12;* Holway, N. Am. Ured. 1: *pl. 39, f. 131;* Sitz.-ber. Böhm. Ges. Wiss. **1900**^{26}: *f. 36–40.*
EXSICCATI: Barth. N. Am. Ured. *630, 2240;* Ellis, N. Am. Fungi *1450;* Ellis & Ev. Fungi Columb. *485;* Ellis & Ev. N. Am. Fungi *2412;* Rel. Farl. *250;* Sydow, Ured. *2020.*

68. **Micropuccinia Musenii** (Ellis & Ev.) Arthur & Jackson.

Puccinia Musenii Ellis & Ev. Bull. Torrey Club **27**: 61. 1900.
Puccinia Seymourii Lindr. Medd. Stockh. Högsk. Bot. Inst. 4^9: 4. 1901.
Allodus Musenii Orton, Mem. N. Y. Bot. Gard. **6**: 193. 1916.

O. Pycnia unknown.

III. Telia amphigenous and caulicolous, scattered or confluent into large groups sometimes 20 mm. long, usually roundish or linear, 0.2–0.4 mm. long, long covered by the epidermis, pulverulent, blackish; teliospores broadly ellipsoid, 18–25 by 29–42 μ, usually rounded at both ends; wall chestnut- or chocolate-brown, 2–3 μ thick, 4–7 μ thick above, conspicuously but finely verrucose, the markings more prominent at apex; pedicel hyaline, deciduous, rarely up to 3 or 4 times length of spore.

ON AMMIACEAE:

Daucophyllum tenuifolium (Nutt.) Rydb. (*Musenion tenuifolium* Nutt.), Nebraska, Wyoming.
Elophus Parishii Coult. & Rose, California.
Oreoxis humilis Raf., Colorado.
Pseudopteryxia anisata (A. Gray) Rydb. (*Pseudocymopterus anisatus* Coult. & Rose), Colorado, Wyoming.
Pseudoreoxis bipinnatus (S. Wats.) Rydb. (*Pseudocymopterus bipinnatus* Coult. & Rose, *Cymopterus bipinnatus* S. Wats.), Montana.
TYPE LOCALITY: Freezeout Hills, Wyoming, on *Musenion tenuifolium*.

DISTRIBUTION: Western Nebraska and Colorado to southern Montana and central California.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 38, f. 126a, b.*
EXSICCATI: Barth. N. Am. Ured. *50;* Clements, Crypt. Form. Colo. *139.*

69. **Micropuccinia poromera** (Holway) Arthur & Jackson.

Puccinia poromera Holway, N. Am. Ured. 1: 90. 1913.

O. Pycnia unknown.

III. Telia amphigenous or caulicolous, on irregular discolored spots, minute, 0.1–0.5 mm. across, gregarious and occasionally confluent, especially on petioles and stems, early naked, chestnut-brown, pulverulent, ruptured epidermis conspicuous; teliospores globoid, broadly ellipsoid, or oblong, small, variable in size, 14–26 by 26–40 μ, rounded at both ends, not or slightly constricted at septum; wall light chestnut-brown, uniformly thin, 1–1.5 μ, with prominent hyaline papilla over pore of either cell, the pore in each cell usually at or near septum, smooth; pedicel hyaline, fragile, short.

ON AMMIACEAE:

Angelica dilatata A. Nelson, Utah.
TYPE LOCALITY: Wasatch Mountains, near Salt Lake City, Utah, on *Angelica dilatata.*
DISTRIBUTION: Salt Lake County, Utah.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 42, f. 136.*
EXSICCATI: Garrett, Fungi Utah. *190.*

70. **Micropuccinia Ligustici** (Ellis & Ev.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Ligustici Ellis & Ev. Bull. Torrey Club **22**: 363. 1895.
Puccinia luteobasis Ellis & Ev. Bull. Torrey Club **24**: 457. 1897.
Dicaeoma Ligustici Kuntze, Rev. Gen. **3**[3]: 469. 1898.

O. Pycnia unknown.

III. Telia amphigenous and caulicolous, round, 0.3–0.8 mm. across, gregarious, often on yellowish spots, occasionally becoming confluent, especially when caulicolous, early naked, becoming pulverulent, chocolate-brown, ruptured epidermis conspicuous, often persisting as a cup-like enclosure surrounding the telia; teliospores broadly ellipsoid or oblong, 16–22 by 24–34 μ, rounded at both ends, not or scarcely constricted at septum; wall uniformly 1.5–2 μ thick, chestnut-brown, smooth, or with a few inconspicuous tubercles scattered or in irregular rows, the pores variable in position and each covered with a small umbo; pedicel colorless, fragile, short, often attached laterally.

This species is correlated with *Dicaeoma Bistortae* (DC.) Kuntze, the telial characters of the two species being quite similar, as well as the habitats, and the family to which the hosts of the short-cycled form belong being the same as that of the known aecial host of the heteroecious species.

ON AMMIACEAE:

Angelica ampla A. Nelson, Colorado.
Angelica Grayi Coult. & Rose, Colorado.
Atenia Gairdneri Hook. & Arn. (*Carum Gairdneri* A. Gray), Utah.
Atenia Garrettii (A. Nelson) Rydb. (*Carum Garrettii* A. Nelson), Utah.
Conioselinum scopulorum (A. Gray) Coult. & Rose (*Ligusticum scopulorum* A. Gray), Colorado.
Ligusticum apiifolium (Nutt.) A. Gray, Oregon, Washington; British Columbia.
Ligusticum Cusickii Coult. & Rose, Nevada.
Ligusticum filicinum S. Wats., Utah.
Ligusticum Grayi Coult. & Rose, California, Washington.
Ligusticum Leibergi Coult. & Rose, Idaho.
Ligusticum Porteri Coult. & Rose, Colorado.
Ligusticum sp., Montana.
Oxypolis Fendleri (A. Gray) A. Heller, Colorado.

TYPE LOCALITY: Sangre de Christo Mountains, Colorado, on *Ligusticum scopulorum.*
DISTRIBUTION: Mountains of southern Colorado to western Nevada, and northward to British Columbia.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 40, f. 132a–f.*
EXSICCATI: Barth. N. Am. Ured. *1456, 1558;* Clements, Crypt. Form. Colo. *321, 322;* Garrett, Fungi Utah. *57, 233.*

71. **Micropuccinia porphyrogenita** (M. A. Curt.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia acuminata Peck, Ann. Rep. N. Y. State Mus. **23**: 57. 1873. Not *P. acuminata* Fuckel, 1870.
Puccinia porphyrogenita M. A. Curt.; Thüm. Myc. Univ. *545*. 1876.
Dicaeoma porphyrogenitum Kuntze, Rev. Gen. **3**[3]: 478. 1898.
Dasyspora acuminata Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, scattered or crowded in groups up to 5 mm. in diameter, opposite red spots, round or oblong, 1–2 mm. across, early naked, pulvinate, chocolate-brown, ruptured epidermis conspicuous; teliospores oblong-clavate or clavate, 16–23 by 45–64 μ, obtuse, acute, or acuminate above, narrowed below, constricted at septum; wall chestnut-brown, 1.5–3 μ thick, thickened at apex, 7–20 μ, smooth; pedicel yellowish-brown, about as long as spore, persistent.

ON CORNACEAE:
Chamaepericlimenum canadense (L.) Asch. & Graebn. (*Cornus canadensis* L.), Alaska, Idaho, Maine, Minnesota, Montana, New Hampshire, New York, Oregon, Washington; Newfoundland; British Columbia, Nova Scotia.
TYPE LOCALITY: Sandlake, New York, on *Cornus canadensis*.
DISTRIBUTION: Newfoundland and Maine along northern border of United States and adjacent Canada to Oregon and Alaska.
ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 3, f. 14;* Holway, N. Am. Ured. **1**: *pl. 44, f. 143.*
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *14;* Barth. Fungi Columb. *4948;* Barth. N. Am. Ured. *1127, 1518;* Ellis, N. Am. Fungi *1032;* Ellis & Ev. Fungi Columb. *1287, 1653;* Rel. Farl. *270;* Seym. & Earle, Econ. Fungi *208;* Sydow, Ured. *333;* Thüm. Myc. Univ. *545.*

72. **Micropuccinia Dayi** (G. W. Clinton) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Dayi G. W. Clinton; Peck, Ann. Rep. N. Y. State Mus. **28**: 60. 1876.
Dicaeoma Dayi Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dasyspora Dayi Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Puccinia Glaucis Arth. Bull. Torrey Club **37**: 571. 1910.

O. Pycnia unknown.

III. Telia mostly hypophyllous, crowded or confluent, sometimes circinating opposite reddish spots 1–6 mm. across, round, 0.1–0.8 mm. in diameter, early naked, pulvinate, light chocolate-brown becoming cinereous by germination, ruptured epidermis evident; teliospores oblong or oblong-clavate, 16–24 by 40–58 μ, obtuse or acute above, rounded or narrowed below, constricted at septum; wall cinnamon-brown, 1.5–2.5 μ, thickened at apex, 5–10 μ, smooth; pedicel tinted, about length of spore.

This species is correlated with *Nigredo Polemonii* (Peck) Arth. and *Dicaeoma Distichlidis* (Ellis & Ev.) Kuntze, the telial characters of the three species being similar or identical, and the hosts of the aecial stage of the two heteroecious species being the same as those of the short-cycled species. This agreement doubtless indicates a common origin for the three species.

ON PRIMULACEAE:
Glaux maritima L., Nova Scotia.
Steironema ciliatum (L.) Raf. (*Lysimachia ciliata* L.), Indiana, Iowa, Michigan, Montana, New York, West Virginia; Alberta, Ontario.
Steironema lanceolatum (Walt.) A. Gray (*Lysimachia lanceolata* Walt.), Wisconsin.
TYPE LOCALITY: Buffalo, New York, on *Lysimachia ciliata*.
DISTRIBUTION: West Virginia to southern Indiana and northwestern Montana, northward into Canada.
ILLUSTRATION: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 1, f. 8.*
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *8;* Barth. Fungi Columb. *2661, 4145;* Barth. N. Am. Ured. *138, 941;* Ellis. N. Am. Fungi *1453;* Ellis & Ev. Fungi Columb. *189;* Seym. & Earle, Econ. Fungi Suppl. *B10;* Sydow, Ured. *2413, 2518.*

73. **Micropuccinia Comandrae** (Peck) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Comandrae Peck, Bull. Torrey Club **11**: 49. 1884.
Dicaeoma Comandrae Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dasyspora Comandrae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia amphigenous and caulicolous, crowded in spots 3–15 mm. across or completely covering the leaves, completely covering the stems in areas 0.8–5.5 cm. long, round, 0.3–1 mm. in diameter, early naked, pulvinate, brownish-black, ruptured epidermis evident; teliospores oblong or ellipsoid, 16–23 by 35–55 μ, rounded or obtuse above, rounded below, slightly constricted at septum; wall chestnut- or golden-brown, 1.5–2.5 μ, thickened at apex, 4–7 μ, smooth; pedicel tinted, up to twice length of spore.

This species is correlated with *Dicaeoma Andropogonis* (Schw.) Kuntze, corresponding to the race having aecia on *Santalaceae*.

ON SANTALACEAE:
Comandra pallida A. DC., Colorado, Montana, Nevada, Utah, Washington; Alberta.
Comandra umbellata (L.) Nutt., California, Michigan, Oregon; Quebec.
TYPE LOCALITY: Washington, on *Comandra pallida*.
DISTRIBUTION: From northern California and central Colorado northward into Canada, and locally from southern Quebec to northern Michigan.
ILLUSTRATION: Holway, N. Am. Ured. 1: *pl. 11, f. 47*.
EXSICCATI: Barth. N. Am. Ured. *134, 1232, 1641, 1752;* Ellis & Ev. Fungi Columb. *1957;* Garrett, Fungi Utah. *17;* Sydow, Ured. *821, 1912*.

74. **Micropuccinia Haleniae** (Arth. & Holway) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Haleniae Arth. & Holway; Arth. Bull. Geol. Nat. Hist. Surv. Minn. **3**: 30. 1887.
Dicaeoma Haleniae Kuntze, Rev. Gen. 3^3: 469. 1898.
Dasyspora Haleniae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia mostly epiphyllous and caulicolous, crowded and confluent in groups 3–12 mm. across on the leaves, up to 3.5 cm. long on the stems, round or oblong, 0.2–0.8 mm. long, remaining covered by the epidermis, compact, hard, chocolate-brown, shining; stroma abundant, surrounding each sorus, golden- or chestnut-brown, up to 60 μ thick; teliospores cylindric or cylindric-clavate, 8–16 by 32–58 μ, truncate, rounded or obtuse above, rounded or narrowed below, not constricted at septum; wall dark cinnamon-brown above, lighter or colorless below, thin, 1–1.5 μ, slightly thickened at apex, 2.5–4 μ, smooth; pedicel light-brown, 10–20 μ long.

ON GENTIANACEAE:
Dasystephana calycosa (Griseb.) Rydb. (*Gentiana calycosa* Griseb.), Wyoming.
Halenia deflexa (J. E. Smith) Griseb., Michigan, Minnesota, Wisconsin.
TYPE LOCALITY: Vermilion Lake, Minnesota, on *Halenia deflexa*.
DISTRIBUTION: Northern Michigan to western Wyoming.
EXSICCATI: Barth. N. Am. Ured. *145, 448;* Vesterg. Micr. Rar. Sel. *1712*.

75. **Micropuccinia concrescens** (Ellis & Ev.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Dicaeoma surinamense Kuntze, Rev. Gen. 3^3: 467, hyponym. 1898.
Puccinia compacta Kunze; Sydow, Monog. Ured. 1: 334. 1902. Not *P. compata* Berk. 1855, De Bary 1858, nor Thüm. 1875.
Dasyspora compacta Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Puccinia concrescens Ellis & Ev.; Arth. Mycologia **7**: 240. 1915.

O. Pycnia unknown.

III. Telia hypophyllous, in orbicular groups on discolored spots, pulvinate, crowded but distinct, becoming confluent at the center into a cushion-like mass 2–4 mm. across, chestnut-brown, often darker at center of the groups and paler at edges; teliospores oblong-elliptic, often irregular, 10–20 by 20–40 μ, rounded or obtuse at both ends, or oftener somewhat narrowed below, slightly or not constricted at septum, which is occasionally oblique; wall chestnut-brown or paler, smooth, uniformly thick, 1.5–2 μ or slightly thicker above in some spores; pedicel as long as or longer than spore, usually deciduous.

ON ASCLEPIADACEAE:
Asclepias curassavica L., Bahamas; Cuba; Porto Rico.
Asclepias nivea L., Porto Rico.
TYPE LOCALITY: Aibonito, Porto Rico, on *Asclepias curassavica*.
DISTRIBUTION: West Indies; also in South America.

ILLUSTRATIONS: Hedwigia Beibl. **42**: 31. *f. 10–14.*
EXSICCATI: Barth. N. Am. Ured. *1642.*

76. **Micropuccinia obliqua** (Berk. & Curt.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia obliqua Berk. & Curt.; Berk. Jour. Linn. Soc. **10**: 356. 1869.
Puccinia Gonolobi Rav.; Berk. Grevillea **3**: 54. 1874.
Puccinia Cynanchi Lagerh. Bol. Soc. Brot. **7**: 129. 1889.
Puccinia Kunzeana P. Henn. Hedwigia **33**: 230. 1894.
Puccinia Philibertiae Ellis & Ev. Bull. Torrey Club **22**: 60. 1895.
Dicaeoma Cynanchi Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dicaeoma Gonolobi Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma obliquum Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Philibertiae Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Puccinia sphaerospora Sydow & Henn.; Sydow, Ann. Myc. **1**: 327. 1903.
Puccinia sphaeroidea P. Henn. Hedwigia Beibl. **42**: 107. 1903.
Dasyspora Gonolobi Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous, chiefly hypophyllous, on discolored spots 2–10 mm. across, gregarious, distinct or becoming more or less confluent, often arranged concentrically, rarely scattered or solitary, mycelium often becoming locally systemic, forming witches' brooms, and then telia scattered evenly or becoming confluent over young stems and both surfaces of leaves, small, round, 0.2–0.8 mm. across, early naked, compact, often pulvinate, cinnamon- or blackish-brown, often cinereous by germination, ruptured epidermis usually not noticeable; teliospores obovate, ellipsoid, or globoid, 15–23 by 24–35 μ, rounded above, rounded or somewhat narrowed below, not constricted at septum; wall golden- or dark cinnamon-brown, variable in thickness, 1.5–3.5 μ, slightly thickened above, 3–6 μ, smooth; pedicel once to twice length of spore, sometimes longer or shorter, colorless or tinted next spore, often inserted obliquely; mesospores occasionally intermixed.

ON ASCLEPIADACEAE:
Fischeria crispiflora (Sw.) Schlecht., Cuba; Jamaica.
Fischeria sp., Panama.
Funastrum clausum (Jacq.) Schlechter (*Cynanchum clausa* Jacq., *Philibertia clausa* K. Schum., *Philibertella clausa* Vail), Florida; Bahamas; Cuba.
Funastrum crassifolium (Hemsl.) Schlechter (*Philibertia crassifolia* Hemsl., *Philibertella crassifolia* Vail), Oaxaca; Guatemala.
Funastrum cynanchoides (Decaisne) Schlechter (*Philibertia cynanchoides* A. Gray, *P. viridiflora* Britt. & Rusby, *Philibertella cynanchoides* Vail), Arizona, New Mexico.
Funastrum hirtellum (A. Gray) Schlechter (*Philibertia linearis hirtella* A. Gray, *P. hirtella* Parish, *Philibertella hirtella* Vail), California.
Funastrum lineare heterophyllum (Engelm.) F. Macbr. (*Philibertia linearis heterophylla* A. Gray, *Philibertella Hartwegii heterophylla* Vail, *P. heterophylla* Cockerell), Arizona, California.
Funastrum sp., Lower California.
Gonolobus laevis Michx. (*Enslenia albida* Nutt., *Ampelanus albidus* Britton), Texas.
Metalepis cubensis Griseb., Cuba.
Metastelma angustifolium Turcz., Mexico (state).
Metastelma bahamense Griseb. (*M. cubense* Griseb.), Florida.
Metastelma barbigerum Scheele, Texas.
Metastelma lineare Bello, Porto Rico.
Metastelma palustre (Pursh) Schlechter (*Vincetoxicum palustre* A. Gray, *Seutera maritima* Decaisne, *S. palustris* Vail), Florida, Mississippi; Bahamas.
Metastelma parviflorum R. Br., Porto Rico; St. Thomas; St. Croix.
Metastelma penicillatum Griseb., Cuba.
Metastelma sp., Panama.
Vincetoxicum bifidum (Hemsl.) Arth. (*Gonolobus bifidus* Hemsl.), Hidalgo, Zacatecas.
Vincetoxicum erianthum (Decaisne) Arth. (*Gonolobus erianthus* Decaisne), Veracruz.
Vincetoxicum gonocarpos Walt. (*Gonolobus macrophyllus* Michx.), Mississippi, South Carolina.
Vincetoxicum hirsutum (Michx.) Britton (*Gonolobus hirsutus* Michx.), Mississippi.
Vincetoxicum mexicanum S. Wats., San Luis Potosí.
Vincetoxicum productum (Torr.) Vail (*Gonolobus productus* Torr.), Arizona.
Vincetoxicum uniflorum (H.B.K.) Arth. (*Gonolobus uniflorus* H.B.K.), Morelos.
Vincetoxicum sp., Kentucky, Louisiana, Texas; Coahuila; Nicaragua; Guatemala.

TYPE LOCALITY: Cuba, on "some plant resembling chickweed," now determined as *Metastelma penicillatum.*

DISTRIBUTION: Southern California to Kentucky and South Carolina southward through the West Indies and Central America; also in South America.

ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 45, f. 578.*

EXSICCATI: Barth. Fungi Columb. *2452;* Barth. N. Am. Ured. *442, 2436;* Ellis, N. Am. Fungi *256;* Kellerm. Fungi Sel. Guat. *5;* Rav. Fungi Car. **4**: *91.*

77. **Micropuccinia Dichondrae** (Mont.) Arthur & Jackson.

Puccinia Dichondrae Mont. in C. Gay, Fl. Chil. **8**: 46. 1852.
Puccinia Berkeleyana De-Toni, in Sacc. Syll. Fung. **7**: 717. 1888.
Puccinia munita F. Ludwig, Zeits. Pflanzenkr. **2**: 133. 1892.
Dicaeoma Berkeleyanum Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dicaeoma Dichondrae Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dicaeoma munitum Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Allodus Dichondrae Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, usually evenly scattered over the entire leaf-surface and often extending to the petioles, round, small, 0.2–0.5 mm. across, punctiform, early naked, pulverulent, chestnut-brown, the conspicuous epidermis forming a peridium-like border; teliospores oblong or clavate, 14–20 by 28–45 μ, rounded or obtuse above, rounded or often narrowed below, constricted at septum; wall cinnamon- or light chestnut-brown, thin, 1.5–2 μ, thickened above by sub-hyaline apiculus to 4–7 μ, smooth; pedicel slender, equaling spore or shorter.

ON DICHONDRACEAE:
Dichondra carolinensis Michx., Louisiana, Mississippi, North Carolina; Bermuda.
Dichondra repens Forst., California.
Dichondra sericea Sw., Guatemala.
TYPE LOCALITY: Chile, on *Dichondra sericea.*
DISTRIBUTION: Southern border of the United States southward through the West Indies and Central America; also in South America, Australia, and New Zealand.
ILLUSTRATION: McAlpine, Rusts Austr. *pl. 5, f. 42; pl. 40, f. 299.*

78. **Micropuccinia Polemonii** (Dietel & Holway) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Polemonii Dietel & Holway; Dietel, Bot. Gaz. **18**: 255. 1893.
?*Puccinia Polemonii* Störmer, Bot. Notiser **1896**: 214. 1896.
Dicaeoma Polemonii Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dasyspora Polemonii Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia amphigenous and petiolicolous, small, round, gregarious and confluent in small groups 0.5–2 mm. across, or more elongate and occurring in lines on the petioles, compact, pulvinate, early naked, golden- or cinnamon-brown, becoming whitish from germination, ruptured epidermis not conspicuous; teliospores oblong or cylindric, 13–18 by 26–42 μ, obtuse above, rounded or somewhat narrowed below, strongly constricted at septum; wall colorless or cinnamon-brown, 1–1.5 μ thick, thickened at apex, 4–6 μ, smooth; pedicel colorless, fragile, as long as spore or shorter.

ON POLEMONIACEAE:
Polemonium intermedium (A. Brand) Rydb., Idaho.
Polemonium occidentale Greene, California.
Polemonium reptans L., Indiana.
TYPE LOCALITY: Kootenai County, Idaho, on *Polemonium caeruleum,* now determined as *P. intermedium.*
DISTRIBUTION: Local in Idaho, central California, and southern Indiana.

79. **Micropuccinia gulosa** (H. S. Jackson) Arthur & Jackson.

Puccinia gulosa H. S. Jackson; Arth. Bull. Torrey Club **47**: 470. 1920.

O. Pycnia unknown.

III. Telia chiefly caulicolous and petiolicolous, oval or elliptic, gregarious and confluent, extending 1–2 cm. along stems and petioles, early naked, cinnamon-brown, pulverulent, ruptured epidermis noticeable; teliospores ellipsoid or oblong, 15–18 by 26–35 μ, rounded above and below, strongly constricted at septum; wall cinnamon-brown, uniformly 1.5–2 μ thick, the apical pore covered with a low sub-hyaline umbo, 2.5–3 μ thick, finely but noticeably verrucose-rugose, best seen when dry; pedicel colorless, short, deciduous.

ON POLEMONIACEAE:
Polemonium pulcherrimum Hook., California.
TYPE LOCALITY: Colby Mountain, Yosemite National Park, California, on *Polemonium pulcherrimum.*
DISTRIBUTION: Known only from the type locality.

80. **Micropuccinia Hydrophylli** (Peck & Clinton) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Hydrophylli Peck & Clinton; Peck, Ann. Rep. N. Y. State Mus. **30**: 54. 1878.
Dicaeoma Hydrophylli Kuntze, Rev. Gen. **3**[3]: 469. 1898.

O. Pycnia unknown.

III. Telia hypophyllous and petiolicolous, occasionally epiphyllous, round, 0.5–1 mm. in diameter, scattered or more commonly gregarious and confluent on yellowish spots 0.2–1 cm. across, early naked, chestnut-brown, pulverulent, ruptured epidermis noticeable; teliospores broadly ellipsoid, 11–20 by 23–30 μ, rounded above and below, slightly constricted at septum; wall cinnamon-brown, uniformly 1–1.5 μ thick, not or scarcely thickened over pores, minutely and moderately verrucose, with conic projections, somewhat less prominent near base of spore; pedicel colorless, short, deciduous.

ON HYDROPHYLLACEAE:
Hydrophyllum capitatum Dougl., Colorado, Utah.
Hydrophyllum Fendleri (A. Gray) A. Heller, Colorado.
Hydrophyllum occidentale A. Gray, California.
Hydrophyllum virginianum L., Iowa, Nebraska, New York, North Dakota, South Dakota, Wisconsin.
Hydrophyllum Watsonii (A. Gray) Rydb., Utah.
TYPE LOCALITY: Buffalo, New York, on *Hydrophyllum virginianum*.
DISTRIBUTION: Northwestern New York to central Colorado and central California, and northward.
EXSICCATI: Barth. Fungi Columb. *3945;* Barth. N. Am. Ured. *346;* Brenckle, Fungi Dak. *490;* Carleton, Ured. Am. *16;* Ellis, N. Am. Fungi *1043;* Ellis & Ev. Fungi Columb. *1855;* Garrett, Fungi Utah. *30, 81;* Sydow, Ured. *472, 1927*.

81. **Micropuccinia Romanzoffiae** (H. S. Jackson) Arthur & Jackson.

Puccinia Romanzoffiae H. S. Jackson, Brooklyn Bot. Gard. Mem. **1**: 268. 1918.

O. Pycnia not seen.

III. Telia chiefly hypophyllous and petiolicolous, crowded in confluent groups 1–2 mm. across, or covering extensive areas on the petioles, small, early naked, pulverulent, chestnut-brown, ruptured epidermis noticeable; teliospores somewhat irregularly ellipsoid or oblong, 19–24 by 34–42 μ, rounded above and below, not or scarcely constricted at septum; wall chestnut-brown, 2–3 μ thick, with large sparsely distributed irregular tubercles, thickened at apex by a low sub-hyaline umbo, 4–5 μ, the pore of lower cell at septum, similarly thickened; pedicel colorless, short, deciduous.

ON HYDROPHYLLACEAE:
Romanzoffia sitchensis Bong., Oregon.
TYPE LOCALITY: Mount Jefferson, Oregon, on *Romanzoffia sitchensis*.
DISTRIBUTION: Known only from the type locality.

82. **Micropuccinia Phaceliae** (Sydow & Holway) Arthur & Jackson.

Puccinia Phaceliae Sydow & Holway; Sydow, Monog. Ured. **1**: 314. 1902.

O. Pycnia not seen.

III. Telia amphigenous, in compact, roundish groups 1–5 mm. across, blackish, permanently covered by epidermis, compound by development of chestnut-brown stroma composed of irregularly clavate paraphysoid hyphae, 48–64 μ long; teliospores angularly clavate or cylindric, 18–20 by 35–48 μ, rounded or truncate above, narrowed below, not constricted at septum; wall thin, 1–1.5 μ, light chestnut-brown, dark chestnut-brown and thickened at apex, 3–7 μ, smooth; pedicel short, colored like spore; mesospores occasionally intermixed.

This species is correlated with one of the races of *Dicaeoma apocryptum* (Ellis & Tracy) Kuntze, the telial characters of the two species being essentially the same, and the host of the short-cycled species corresponding to a group of aecial hosts of the heteroecious species.

ON HYDROPHYLLACEAE:
Phacelia sericea (Graham) A. Gray, Washington.
TYPE LOCALITY: Mount Tacoma, Washington, on *Phacelia circinata*, error for *P. sericea*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *1464*.

83. **Micropuccinia Heliotropii** (Kern & Kellerm.) Arthur & Jackson.

Puccinia Heliotropii Kern & Kellerm.; Kern, Jour. Myc. **13**: 23. 1907.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, gregarious, densely crowded in orbicular groups 2–8 mm. across, often confluent, round, small, 0.1–0.4 mm. across, early naked, compact, somewhat pulvinate, chestnut-brown, becoming cinereous by germination, ruptured epidermis inconspicuous; teliospores oblong, ellipsoid, or oblong-obovoid, 14–19 by 35–45 μ, rounded or obtuse above, usually narrowed to pedicel below, slightly constricted at septum; wall nearly colorless or light cinnamon-brown, thin, 1–1.5 μ, thickened 3–7 μ above, smooth; pedicel colorless, fragile, equaling spore, usually deciduous; mesospores occasionally intermixed.

ON HELIOTROPIACEAE:
Heliotropium indicum L., Guatemala.
TYPE LOCALITY: Gualán, Zacapa, Guatemala, on *Heliotropium indicum*.
DISTRIBUTION: Eastern Guatemala.

84. **Micropuccinia Mertensiae** (Peck) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Mertensiae Peck, Bot. Gaz. **6**: 227. 1881.
Dicaeoma Mertensiae Kuntze, Rev. Gen. **3**^{3}: 469. 1898.

O. Pycnia unknown.

III. Telia chiefly hypophyllous or petiolicolous, occasionally epiphyllous, round, 0.2–1 mm. in diameter, gregarious and more or less confluent in groups 0.5–1 cm. across, on yellowish spots, early naked, chocolate-brown, pulverulent, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, 18–21 by 24–32 μ, rounded above and below, slightly constricted at septum; wall cinnamon-brown, 1.5–2 μ thick, scarcely thickened at apex and over pore of lower cell, which is usually depressed half way to pedicel, closely and finely verrucose-tuberculate with flat tubercles, which become successively smaller and closer from apex to base of spore; pedicel colorless, deciduous.

ON BORAGINACEAE:
Mertensia arizonica Greene, Utah.
Mertensia Bakeri Greene, Colorado.
Mertensia ciliata (Torr.) G. Don (*M. sibirica* G. Don, *M. polyphylla* Greene), Colorado, Utah, Wyoming.
Mertensia foliosa A. Nelson, Utah.
TYPE LOCALITY: Colorado, on *Mertensia sibirica*.
DISTRIBUTION: Mountain region of Colorado, Wyoming and Utah.
EXSICCATI: Clements, Crypt. Form. Colo. *571;* Garrett, Fungi Utah. *166;* Sydow, Ured. *1931*.

85. **Micropuccinia Urbaniana** (P. Henn.) Arthur & Jackson.

Puccinia Urbaniana P. Henn. Hedwigia **37**: 278. 1898.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, occasionally epiphyllous, gregarious and more or less confluent in groups 5–10 mm. across, on brownish or purplish spots, often arranged in a concentric manner, small, 0.2–0.5 mm. across, roundish, somewhat tardily naked, compact, pulvinate, blackish-brown becoming cinereous by germination, ruptured epidermis usually not conspicuous; teliospores ellipsoid or clavate, 14–22 by 28–45 μ, somewhat irregular, rounded above, narrowed to pedicel below, slightly constricted at septum; wall cinnamon- or light chestnut-brown, 1–2 μ thick, thickened 4–7 μ above, smooth; pedicel fragile, colored like the spore-wall or lighter, equaling spore or shorter.

ON VERBENACEAE:
Cornutia grandifolia Schauer, Guatemala.
Valerianodes cayennensis (Vahl) Kuntze (*Stachytarpheta cayennensis* Vahl), Costa Rica.
Valerianodes jamaicensis (L.) Kuntze (*Stachytarpheta jamaicensis* Vahl, *S. dichotoma* Vahl), Florida; Guatemala; Jamaica; Bahamas; Cuba; Porto Rico.
Valerianodes strigosa (Vahl) Cook & Collins (*Stachytarpheta strigosa* Vahl), Mona Island; Porto Rico.
TYPE LOCALITY: Port Antonio, Jamaica, on *Stachytarpheta jamaicensis*.

DISTRIBUTION: Southern Florida, the West Indies, and Central America; also in South America.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 21, f. 298*.
EXSICCATI: Barth. N. Am. Ured. *669, 1672*.

86. **Micropuccinia Lantanae** (Farl.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Lantanae Farl. Proc. Am. Acad. Sci. **18**: 83. 1883.
Uromyces Lantanae Speg. Anal. Soc. Ci. Argent. **17**: 93. 1884.
Caeomurus Lantanae Kuntze, Rev. Gen. **3**^{3}: 450. 1898.
Dicaeoma Lantanae Kuntze, Rev. Gen. **3**^{3}: 469. 1898.
Puccinia accedens Sydow, Mong. Ured. **1**: 309. 1902.
Dasyspora Lantanae Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Puccinia Privae Sydow, Ann. Myc. **5**: 338. 1907.
Uromyces Lippiae Speg. Anal. Mus. Nac. Buenos Aires **19**: 313. 1909.

O. Pycnia unknown.

III. Telia hypophyllous, occasionally epiphyllous, gregarious and more or less confluent on purplish spots 2–10 mm. across, few to many, roundish, 0.2–0.5 mm. across, compact, pulvinate, early naked, blackish becoming cinereous by germination, ruptured epidermis usually not conspicuous; teliospores irregularly ellipsoid or clavate, 15–20 by 24–40 μ, rounded above, rounded or narrowed below, slightly constricted at septum; wall 1.5–2.5 μ, thickened 3–5 μ above, chestnut-brown above, lighter below, smooth; pedicel firm, colorless or tinted like the spore, often slightly inflated above, once to twice length of spore; mesospores usually more numerous than teliospores, angularly ellipsoid or obovate, 15–20 by 20–32 μ, rounded above, narrowed to pedicel below, otherwise like teliospores.

ON VERBENACEAE:
Goniostachyum citrosum Small, Florida.
Lantana aculeata L., St. Thomas.
Lantana Camara L., Costa Rica; Cuba; Jamaica; Porto Rico.
Lantana crocea Jacq., Jamaica.
Lantana hispida H.B.K., Costa Rica.
Lantana involucrata L. (*L. odorata* L.), Florida; Bermuda; Cuba; Mona Island; Porto Rico.
Lantana purpurea Benth. & Hook., Guerrero, Morelos, Veracruz.
Lantana reticulata Pers., Cuba.
Lantana stricta Sw., Jamaica.
Lantana trifolia L., Panama; Cuba.
Lippia dulcis Trev., Cuba.
Lippia nodiflora (L.) Rich., Haïti.
Lippia stoechadifolia (L.) H.B.K. (*Phyla stoechadifolia* Small), Cuba.
Priva lappulacea (L.) Pers. (*P. echinata* Juss.), Cuba; Jamaica.
TYPE LOCALITY: Bermuda, on *Lantana odorata*.
DISTRIBUTION: Southern Florida, the West Indies, southern Mexico, and Central America; also in South America.
ILLUSTRATIONS: Sydow, Mong. Ured. **1**: *pl. 20, f. 291; pl. 21, f. 297;* **2**: *pl. 2, f. 28*.
EXSICCATI: Barth. N. Am. Ured. *645, 646, 749, 1161;* Ellis, N. Am. Fungi *1052*.

87. **Micropuccinia permagna** (Arth. & Holway) Arthur & Jackson.

Puccinia permagna Arth. & Holway; Arth. Mycologia **10**: 134. 1918.

O. Pycnia epiphyllous, loosely grouped on yellowish spots, 0.4–1.5 mm. across, noticeable, blackish-brown, conoidal, 112–128 μ broad by 55–80 μ high; ostiolar filaments not noticeable.

III. Telia mostly hypophyllous, numerous, single or crowded into irregular groups, roundish, large, 1–2.5 mm. across, somewhat pulvinate, cinnamon-brown, ruptured epidermis inconspicuous; teliospores broadly ellipsoid, 24–27 by 35–42 μ, rounded at both ends, slightly constricted at septum; wall cinnamon-brown, thin, 1 μ, thicker above and over pore near septum, 3–6 μ, forming a hyaline umbo, smooth; pedicel very large and inflated, 20–25 μ in diameter, often somewhat fusiform, four or five times length of spore, the wall colorless, thin, 1 μ, usually thickened next to spore.

ON VERBENACEAE:
Lippia myriocephala Schlecht. & Cham., Costa Rica.
TYPE LOCALITY: San José, Costa Rica, on *Lippia myriocephala*.
DISTRIBUTION: Known only from the type locality.

88. **Micropuccinia distorta** (Holway) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia distorta Holway, Ann. Myc. **3**: 22. 1905.
Dasyspora distorta Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia epiphyllous, crowded in small groups about 1 mm. in diameter, inconspicuous, golden-brown, globoid or ellipsoid, 90–125 by 100–195 μ; ostiolar filaments up to 120 μ long, agglutinate into a column.

III. Telia mostly hypophyllous or caulicolous, crowded in irregular groups 1–5 mm. across or up to 3 cm. on stems and causing distortion, round or oblong, 0.3–2 mm. across, early naked, pulverulent, light chocolate-brown, ruptured epidermis evident; teliospores broadly ellipsoid or obovoid-ellipsoid, 20–27 by 29–40 μ, rounded at both ends or somewhat narrowed below, not constricted at septum; wall light chestnut-brown, uniform, 2–3 μ thick, closely and finely verrucose, the pore of upper cell in upper one-third, of lower cell in lower one-third; pedicel colorless, somewhat fragile, up to 80 μ long.

ON LAMIACEAE:
Hyptis Emoryi Torr. (*Mesosphaerum Emoryi* Kuntze), Arizona, California.
Hyptis pectinata Poir. (*Mesosphaerum pectinatum* Kuntze), Guerrero, Jalisco, Morelos, Veracruz.
TYPE LOCALITY: Iguala, Guerrero, Mexico, on *Mesosphaerum pectinatum*.
DISTRIBUTION: Southern California to Southern Mexico.
EXSICCATI: Barth. N. Am. Ured. *433*.

89. **Micropuccinia Physostegiae** (Peck & Clinton) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Physostegiae Peck & Clinton; Peck, Ann. Rep. N. Y. State Mus. **29**: 50. 1878.
Dicaeoma Physostegiae Kuntze, Rev. Gen. **3**^{3}: 470. 1898.
Dasyspora Physostegiae H. S. Jackson, Proc. Ind. Acad. Sci. **1915**: 440. 1916.

O. Pycnia unknown.

III. Telia hypophyllous, crowded, often covering the entire lower surface of leaf, round, 0.3–0.8 mm. in diameter, often somewhat tardily naked, bullate, pulverulent, chocolate-brown, ruptured epidermis conspicuous; teliospores oblong or ellipsoid, 19–26 by 32–48 μ, rounded above and below, not constricted at septum; wall light chestnut-brown, thick, 2.5–3 μ, sometimes thickened up to 5 μ at apex, closely and finely verrucose; pedicel colorless, about one half length of spore.

ON LAMIACEAE:
Dracocephalum Nuttallii Britton (*Physostegia parviflora* Nutt.), Montana.
Dracocephalum virginianum L. (*Physostegia virginiana* Benth.), Indiana, New York.
TYPE LOCALITY: Strawberry Island, [New York], on *Physostegia virginiana*.
DISTRIBUTION: Locally in New York, Indiana, and Montana.
EXSICCATI: Barth. N. Am. Ured. *1465, 1771*.

90. **Micropuccinia Schneideri** (Schroet.) Arthur & Jackson.

Puccinia caulincola W. G. Schneid. Jahresb. Schles. Ges. **48**: 120. 1870. Not *P. caulincola* Spreng. 1828.
Puccinia Schneideri Schroet.; W. G. Schneid. Herb. Schles. Pilze *448*. 1879.

O. Pycnia unknown.

III. Telia caulicolous, scattered or crowded in small groups from a perennial mycelium, oblong or linear, 1–3 mm. long, soon naked, pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; teliospores ellipsoid, 18–21 by 26–31 μ, rounded at both ends, slightly constricted at septum; wall golden-brown 1.5–2 μ thick, thickened up to 5 μ over pores, smooth, the pore of upper cell apical, of lower variable; pedicel colorless, up to twice length of spore; mesospores ellipsoid, 18–20 by 21–25 μ.

ON LAMIACEAE:
Thymus Serpyllum L., Greenland.
TYPE LOCALITY: Silesia, on *Thymus Chamaedrys*.
DISTRIBUTION: Southern Greenland; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz **2**^{2}: *f. 133;* Krypt.-fl. Brand. Pilze **3**: *f. B43*.

91. **Micropuccinia Hyssopi** (Schw.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Hyssopi Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832.
Puccinia Sydowiana Zopf; Zopf & Syd. Myc. Mar. *40*. 1880.
Leptopuccinia Hyssopi Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown.

III. Telia hypophyllous, scattered or crowded in groups 1–3 mm. across, round, 0.2–0.7 mm. in diameter, early naked, pulvinate, golden- or chestnut-brown, ruptured epidermis inconspicuous; teliospores cylindric, narrowly ellipsoid, or clavate-oblong, 13–21 by 34–50 μ, obtuse or acute above, rounded or narrowed below, slightly constricted at septum; wall light chestnut- or pale golden-brown, 1.5–2 μ thick, thickened at apex, 6–12 μ, smooth; pedicel tinted, up to 35 μ long, 7–10 μ broad next to spore, often tapering downward, thin-walled, often collapsing.

ON LAMIACEAE:
Agastache nepetoides (L.) Kuntze (*Hyssopus nepetoides* L., *Lophanthus nepetoides* Benth.), Illinois, Indiana, Iowa, New York, Ohio.
Agastache scrophulariaefolia (Willd.) Kuntze (*Hyssopus scrophulariaefolius* Willd., *Lophanthus scrophulariaefolius* Benth.), Minnesota, Pennsylvania, West Virginia.
TYPE LOCALITY: Bethlehem, Pennsylvania, on *Hyssopus scrophulariaefolius*.
DISTRIBUTION: New York to West Virginia, westward to Minnesota and Iowa; also in Germany (cult.).
ILLUSTRATION: Zopf. & Syd. Myc. Mar. *40*.
EXSICCATI: Ellis, N. Am. Fungi *1053;* Ellis & Ev. N. Am. Fungi *1837;* Kellerm. Ohio Fungi *152*.

92. **Micropuccinia pallidissima** (Speg.) Arthur & Jackson.

Puccinia pallidissima Speg. Anal. Soc. Ci. Argent. 12: 69. 1881.
Puccinia albida Dietel & Neger, Bot. Jahrb. 24: 160. 1897.

O. Pycnia unknown.

III. Telia hypophyllous, crowded in groups 0.5–2 mm. across, round, 0.1–0.5 mm. in diameter, early naked, pulvinate, pale golden-brown becoming cinereous by germination, ruptured epidermis rather inconspicuous; teliospores fusiform-oblong or oblong-clavate, 12–15 by 34–42 μ, slightly narrowed or rounded above, slightly narrowed below, not or slightly constricted at septum; wall colorless or light-yellow, thin, 1 μ, thickened at apex, 2–5 μ, smooth; pedicel colorless, fragile, up to length of spore.

ON LAMIACEAE:
Stachys Lindenii Benth., Guatemala.
TYPE LOCALITY: Sierra Chica mountains, near San José, Córdoba, Argentina, on *Stachys arvensis*.
DISTRIBUTION: Guatemala; also in South America.

93. **Micropuccinia delicatula** (Arth.) Arthur & Jackson.

Polioma delicatula Arth. Jour. Myc. **13**: 29. 1907.
Puccinia delicatula Sacc. & Trott. in Sacc. Syll. Fung. **21**: 657. 1912.

O. Pycnia unknown.

III. Telia hypophyllous, soon naked, pulvinate, scattered, round, 0.3–0.4 mm. in diameter, or confluent in compact groups 0.5–2 mm. across, dirty-white, ruptured epidermis inconspicuous; teliospores oblong or lanceolate-oblong, 12–16 by 27–48 μ, obtuse above and below, slightly or not constricted at septum, germinating at maturity; wall colorless, uniformly thin, 1–1.5 μ, smooth; pedicel hyaline, fragile, once length of spore or longer, but breaking near the spore and appearing short.

ON LAMIACEAE:
Salvia cinnabarina Mart. & Gal., Guatemala.
Salvia elegans Vahl, Guatemala; Mexico (state).
Salvia Holwayi Standley, Guatemala.
Salvia pulchella DC., Guatemala.
TYPE LOCALITY: Sacred Mount, Amecameca, Mexico, on *Salvia elegans*.
DISTRIBUTION: Southern Mexico and Central America.

94. **Micropuccinia nivea** (Holway) Arthur & Jackson.

Puccinia nivea Holway, Jour. Myc. **11**: 158. 1905.
Polioma nivea Arth. Jour. Myc. **13**: 29. 1907.

O. Pycnia epiphyllous, in small groups, inconspicuous, honey-yellow, globoid, 130–160 μ broad by 110–145 μ high; ostiolar filaments short; pycniospores globoid, 3–4 μ in diameter.

III. Telia chiefly hypophyllous, gregarious, often confluent, in compact groups 1–2 mm. across, soon naked, round, pulvinate, 0.3–0.4 mm. in diameter, dirty-white becoming cinereous by germination, ruptured epidermis inconspicuous; teliospores clavate-oblong or cylindric, 21–23 by 48–61 μ, rounded or obtuse above, usually narrowed below, slightly constricted at septum; wall colorless, moderately thin, 1–2 μ, slightly or not thickened above, smooth; pedicel hyaline, broad, short.

ON LAMIACEAE:
Salvia purpurea Cav., Oaxaca.
TYPE LOCALITY: Oaxaca, Mexico, on *Salvia purpurea*.
DISTRIBUTION: Known only from the type locality.

95. **Micropuccinia Physalidis** (Peck) Arthur & Jackson.

Puccinia Physalidis Peck, Bot. Gaz. **4**: 218. 1879.
Dicaeoma Physalidis Kuntze, Rev. Gen. **3**^{3}: 470. 1898.

O. Pycnia not known, probably not formed.

III. Telia hypophyllous, rarely epiphyllous evenly scattered over large areas, evidently from a distributed mycelium, at first punctiform, firm, becoming more or less pulverulent, small, round, 0.2–0.8 mm. across, somewhat tardily naked, chestnut-brown, ruptured epidermis conspicuous; teliospores variable, ellipsoid, obovoid, oblong, or rarely clavate, 16–26 by 28–38 μ, rounded above, rounded, or less commonly narrowed below, slightly or not constricted at septum; wall cinnamon-brown , 1.5–3 μ thick, not or very slightly thickened bove to 4 μ, smooth; pedicel colorless, slender, once length of spore, or more commonly deciduous; mesospores occasionally intermixed.

ON SOLANACEAE:
Physalis heterophylla Nees (*P. viscosa* Pursh not L.), Colorado, Nebraska; Manitoba.
Physalis lanceolata Michx., Iowa.
Physalis virginiana Mill., Wisconsin; Manitoba.
TYPE LOCALITY: Colorado, on *Physalis viscosa*.
DISTRIBUTION: Eastern Colorado to central Wisconsin, northward into Canada.
ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 18, f. 255*.
EXSICCATI: Barth. N. Am. Ured. *161, 562;* Ellis & Ev. Fungi Columb. *1652*.

96. **Micropuccinia solanita** (Schw.) Arthur & Jackson.

Aecidium solanitum Schw.; Berk. & Curt. Jour. Acad. Phila. II. **2**: 283. 1853.
Puccinia claviformis Lagerh. Tromsö Mus. Aarsh **17**: 53. 1895.
Dicaeoma claviforme Kuntze, Rev. Gen. **3**^{3}: 468. 1898.
Puccinia solanita Arth. Mycologia **14** : 19. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, densely gregarious and finally more or less confluent in irregular or orbicular groups 0.5–2 cm. across, on yellowish or discolored spots, small, round, 0.2–0.5 mm. across, at first punctate, compact, becoming somewhat pulvinate, somewhat tardily naked, chestnut-brown becoming cinereous by germination, ruptured epidermis at first noticeable; teliospores somewhat irregularly ellipsoid, obovate, or clavate, 16–26 by 32–46 μ, rounded above, rounded or more commonly narrowed below, usually slightly constricted at septum; wall cinnamon-brown, 1–2.5 μ thick, gradually thickened above, 3–5 μ, smooth; pedicel colorless, or slightly tinted, one half length of spore or shorter; mesospores occasionally intermixed.

ON SOLANACEAE:
Solanum Donnell-Smithii Coult., Panama.
TYPE LOCALITY: Surinam, on *Solanum* sp.
DISTRIBUTION: Panama; also in northern South America.
ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 18, f. 262*.

97. **Micropuccinia Sarachae** (Mayor) Arthur & Jackson.

Puccinia Sarachae Mayor, Mém. Soc. Neuch. Sci. Nat. 5: 499. 1913.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, densely gregarious in groups 0.2–1 cm. across, on discolored spots, at first yellowish, small, round, 0.2–0.5 mm. in diameter, compact, cinnamon- or chestnut-brown, becoming pulvinate and cinereous by germination; teliospores ellipsoid or obovate, 16–23 by 29–39 μ, rounded or occasionally obtuse above, rounded or somewhat narrowed below, not or very slightly constricted at septum; wall golden-brown below, cinnamon-brown above, 1.5–3 μ thick, considerably thickened above, 5–8 μ, smooth; pedicel colorless, twice length of spore or shorter; mesospores occasionally intermixed.

ON SOLANACEAE:
Saracha jaltomata Schlecht., Costa Rica.
TYPE LOCALITY: Cafetal La Camelia, near Angelopolis, Antioquia, Colombia, on *Saracha edulis*.
DISTRIBUTION: Costa Rica; also in northern South America.
ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. 5: *f. 29*.

98. **Micropuccinia incondita** (Arth.) Arthur & Jackson.

Puccinia incondita Arth. Bull. Torrey Club 45: 148. 1918.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous and caulicolous, closely gregarious or confluent into more or less rounded pulvinate masses 1–3 mm. across, dark cinnamon-brown, early naked, ruptured epidermis inconspicuous; teliospores irregularly ellipsoid or oblong, 16–20 by 23–28 μ, rounded at both ends or rarely somewhat narrowed below, slightly or not constricted at septum; wall cinnamon-brown, 1.5–2.5 μ thick, not or somewhat thicker above, up to 6 μ, smooth; pedicel colorless, sometimes longer than spore, usually breaking near spore.

ON SOLANACEAE:
Solanum triquetrum Cav., Texas.
TYPE LOCALITY: Austin, Texas, on *Solanum triquetrum*.
DISTRIBUTION: Known only from the type locality.

99. **Micropuccinia Pittieriana** (P. Henn.) Arthur & Jackson.

Puccinia Pittieriana P. Henn. Hedwigia 43: 147. 1904.
Uredo Pittieri P. Henn.; Pittier, Pl. Usual. Costa Rica 69, 122, hyponym. 1908.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, densely gregarious and finally more or less confluent in orbicular groups 3–5 mm. across, on yellowish or discolored spots, small, round, 0.2–0.5 mm. across, early naked, chestnut-brown, at first compact, becoming somewhat pulverulent in resting form, in germinating form becoming pulvinate and cinereous, ruptured epidermis not conspicuous; teliospores small, broadly ellipsoid or oblong, 18–23 by 26–34 μ, rounded above and below, not or slightly constricted at septum; wall cinnamon-brown, 1–2.5 μ thick, slightly and gradually thickened above, 4–6 μ, smooth; pedicel colorless, firm, once to twice length of spore or more, commonly deciduous; mesospores commonly intermixed.

ON SOLANACEAE:
Solanum tuberosum L., Costa Rica.
TYPE LOCALITY: Volcán de Irazú, Costa Rica, on *Solanum tuberosum*.
DISTRIBUTION: Mountains of Costa Rica; also in Ecuador, South America.

100. **Micropuccinia acrophila** (Peck) Arthur & Jackson.

Puccinia acrophila Peck, Bot. Gaz. 6: 227. 1881.
Dicaeoma acrophilum Kuntze, Rev. Gen. 3[3]: 467. 1898.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous, chiefly hypophyllous, solitary, or few and crowded on purplish spots 3–8 mm. across, roundish, large, 0.4–1.5 mm. in diameter, long covered by the thin polished epidermis, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; teliospores broadly ellipsoid, 16–21 by 24–34 μ, rounded above and below, slightly or not constricted

at septum; wall cinnamon-brown, 1.5–2.5 μ thick, very slightly thickened over pore of each cell, 3–3.5 μ, finely and closely verrucose; pedicel short, colorless, one half length of spore, commonly deciduous.

ON SCROPHULARIACEAE:
Besseya Ritteriana (Eastw.) Rydb. (*Synthyris Ritteriana* Eastw.), Colorado.
Besseya rubra (Dougl.) Rydb. (*Synthyris rubra* Benth.), Montana.
Synthyris laciniata (A. Gray) Rydb., Utah.
Synthyris pinnatifida S. Wats., Utah.
TYPE LOCALITY: Utah, on *Synthyris pinnatifida*.
DISTRIBUTION: Southern Montana to Utah and central Colorado.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 17, f. 240*.

101. **Micropuccinia Clintonii** (Peck) Arthur & Jackson.

Puccinia Clintonii Peck, Ann. Rep. N. Y. State Mus. **28**: 61. 1876.
Dicaeoma Clintonii Kuntze, Rev. Gen. **3**[3]: 468. 1898.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous and caulicolous, rarely epiphyllous, usually scattered and solitary on discolored, often sunken spots, round, large, 0.5–1.5 mm. across, the resting form tardily naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous, the germinating form compact, pulvinate, at first light cinnamon-brown, becoming cinereous by abundant germination, ruptured epidermis not conspicuous; teliospores ellipsoid, oblong, or broadly clavate, 15–18 by 26–36 μ, rounded or obtuse above, rounded or narrowed below, usually strongly constricted at septum; wall golden-brown or nearly colorless in the germinating form, cinnamon-brown in the resting form, 1.5–2 μ thick, thickened above, often with sub-hyaline umbo, 3–6 μ, very finely striate-verrucose in longitudinal lines, germinating form often smooth; pedicel colorless, fragile, equaling spore, commonly deciduous.

ON SCROPHULARIACEAE:
Elephantella groenlandica (Retz.) Rydb. (*Pedicularis groenlandica* Retz.), Idaho.
Pedicularis bracteosa Benth., Colorado, Oregon; Alberta.
Pedicularis canadensis L., Michigan, New York, Wisconsin.
Pedicularis fluviatilis A. Heller, New Mexico.
Pedicularis racemosa Dougl., Oregon; Alberta.
TYPE LOCALITY: Goat Island, [Niagara Falls,] New York, on *Pedicularis* [*canadensis*].
DISTRIBUTION: Northwestern New York to Oregon and British Columbia, and one locality in the mountains of New Mexico.
EXSICCATI: Barth. Fungi Columb. *3063, 5054;* Barth. N. Am. Ured. *30*.

102. **Micropuccinia rhaetica** (Ed. Fisch.) Arthur & Jackson.

Puccinia rhaetica Ed. Fisch. Bull. Herb. Boiss. **7**: 420. 1899.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, scattered or occasionally gregarious, large, roundish, 1–2 mm. across, somewhat tardily naked, pulverulent, chestnut-brown, ruptured epidermis cinereous and persistent; teliospores ellipsoid, oblong, or obovate, 16–20 by 30–40 μ, rounded or obtuse above, rounded or occasionally slightly narrowed below, not or slightly constricted at septum; wall light cinnamon-brown, 1.5–3 μ thick, thickened above, 3–5 μ, in part by a sub-hyaline umbo, similarly thickened over pore of lower cell at septum, from nearly smooth to distinctly but minutely verrucose-rugose, especially in upper half; pedicel colorless, fragile, equaling spore but commonly broken off close to spore.

ON SCROPHULARIACEAE:
Veronica Cusickii A. Gray, Washington.
TYPE LOCALITY: Val Zeynina, near Lavin, Switzerland, on *Veronica bellidioides*.
DISTRIBUTION: Cascade Mountains in Washington; also in mountains of central Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz **2**[2]: *f. 238*; Fl. Ital. Crypt. Ured. *f. 60d*.

103. **Micropuccinia Chelonis** (Dietel & Holway) Arthur & Jackson.

Puccinia Chelonis Dietel & Holway; Dietel, Hedwigia **36**: 297. 1897.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, rarely epiphyllous, closely gregarious on purplish spots 5–15

mm. across, sometimes confluent, especially in center, often arranged in concentric manner near margin of groups, large, 1–2 mm. across, early naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; teliospores broadly ellipsoid or oblong, 20–26 by 32–38 μ, rounded above and below, slightly constricted at septum; wall cinnamon-brown, 1.5–2.5 μ thick, not or very slightly thickened over pores, appearing smooth in water, obscurely verrucose-rugose when dry; pedicel colorless, short, deciduous.

ON SCROPHULARIACEAE:
Chelone nemorosa Dougl., Oregon, Washington.
TYPE LOCALITY: Chiquash Mountains, Skamania county, Washington, on *Chelone nemorosa*.
DISTRIBUTION: Mountains of southern Washington and adjacent Oregon.
EXSICCATI: Barth. N. Am. Ured. *128*.

104. **Micropuccinia Pentstemonis** (Peck) Arthur & Jackson.

Puccinia Pentstemonis Peck, Bull. Torrey Club **12**: 35. 1885.
Puccinia mexicana Dietel & Holway; Holway, Bot. Gaz. **24**: 33. 1897.
Puccinia circinans Ellis & Ev. Bull. Torrey Club **27**: 61. 1900. Not *P. circinans* Fuckel, 1870, nor Dietel, 1897.
Puccinia Toumeyi Sydow; Sacc. Syll. Fung. **16**: 299. F 1902.
Puccinia chasmatis Ellis & Ev. Jour. Myc. **8**: 15. My 1902.

O. Pycnia not seen.

III. Telia amphigenous and caulicolous, usually hypophyllous, densely gregarious in groups 5–15 mm. across, on discolored often purplish spots, usually distinct but occasionally confluent in center, often arranged in circinate manner at margin, small, round, 0.2–0.5 mm. across, compact, rarely pulvinate, somewhat tardily naked, blackish-brown, pulvinate sori becoming cinereous by germination, ruptured epidermis conspicuous; teliospores ellipsoid, oblong, or obovate, 18–26 by 32–48 μ, rounded or obtuse above, rounded or narrowed below, not or slightly constricted at septum; wall cinnamon-brown, 1.5–3 μ, darker and thickened at apex, 5–10 μ, smooth; pedicel colorless or slightly tinted next to spore, firm, once to twice length of spore.

This species is correlated with *Dicaeoma Andropogonis* (Schw.) Kuntze, corresponding in part to the race having aecia on *Scrophulariaceae*.

ON SCROPHULARIACEAE:
Penstemon azureus Benth., California.
Penstemon Bridgesii A. Gray, California.
Penstemon campanulatus Willd., Hidalgo, Mexico (state).
Penstemon deustus Dougl., California, Wyoming.
Penstemon diffusus Dougl., Oregon.
Penstemon linarioides A. Gray, Arizona.
Penstemon Roezli Regel, California.
Penstemon spectabilis Thurber, Arizona, California.
TYPE LOCALITY: Arizona, on *Penstemon linarioides*.
DISTRIBUTION: Eastern Oregon to Western Wyoming and southward in the mountains through Mexico.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 16, f. 239*.
EXSICCATI: Barth. N. Am. Ured. *1259;* D. Griff. W. Am. Fungi *393*.

105. **Micropuccinia Seymeriae** (Burrill) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Seymeriae Burrill, Bot. Gaz. **9**: 189. 1884.
Dicaeoma Seymeriae Kuntze, Rev. Gen. **3**^{3}: 470. 1898.
Puccinia Gerardiae Sydow, Ann. Myc. **1**: 18. 1903.
Dasyspora Seymeriae Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous and caulicolous, rarely epiphyllous, densely gregarious and more or less confluent in orbicular groups 3–10 mm. across, on discolored spots, or elongate and causing some hypertrophy when caulicolous, roundish, small, 0.2–0.5 mm. across, somewhat tardily naked, compact, slightly pulvinate, chestnut-brown, ruptured epidermis usually noticeable; teliospores ellipsoid, oblong, or clavate, 16–20 by 26–38 μ, rounded or obtuse above, rounded or occasionally narrowed below, not or very slightly constricted at septum; wall dark cinnamon-brown, 1.5–3 μ thick, gradually thickened at apex, 5–9 μ, smooth; pedicle firm, colorless, once to twice length of spore.

This species is correlated with *Dicaeoma Andropogonis* (Schw.) Kuntze, corresponding in part to the race having aecia on *Scrophulariaceae*.

ON SCROPHULARIACEAE:
Agalinis Besseyaia Britton (*Gerardia tenuifolia macrophylla* Benth., *G. Besseyana* Britton), Illinois.
Dasistoma macrophylla (Nutt.) Raf. (*Seymeria macrophylla* Nutt., *Afzelia macrophylla* Kuntze), Illinois, Indiana, Kansas, Nebraska, Ohio.
TYPE LOCALITY: Bloomington, Illinois, on *Seymeria macrophylla*.
DISTRIBUTION: Upper Mississippi Valley from Northern Ohio to Eastern Kansas and Nebraska.
EXSICCATI: Barth. Fungi Columb. *3368;* Ellis & Ev. N. Am. Fungi *1835, 2249;* Kellerm. Ohio Fungi *176;* Sydow, Ured. *1717*.

106. **Micropuccinia nesodes** (Arth. & Holway) Arthur & Jackson.

Puccinia nesodes Arth. & Holway; Arth. Mycologia **10**: 138. 1918.

O. Pycnia unknown.

III. Telia chiefly hypophyllous, more or less confluent in circular groups 1–6 mm. across, early naked, round, 0.1–0.5 mm. in diameter, pulvinate, chestnut-brown, becoming cinereous by germination, ruptured epidermis inconspicuous; teliospores obovoid or ellipsoid, 14–19 by 26–40 μ, rounded above, narrowed or rounded below, slightly constricted at septum; wall golden- or light cinnamon-brown, thin, 1.5–2.5 μ, gradually thickened above to 3–7 μ, smooth; pedicel colorless, once or twice length of spore.

ON SCROPHULARIACEAE:
Castilleja communis Benth., Guatemala.
Castilleja tenuiflora Benth., Guatemala.
Lamourouxia Gutierrezii Oerst., Costa Rica.
Lamourouxia viscosa H.B.K., Costa Rica.
TYPE LOCALITY: Tres Rios, near San José, Costa Rica, on *Lamourouxia viscosa*.
DISTRIBUTION: Central America.

107. **Micropuccinia Veronicarum** (DC.) Arthur & Jackson.

Puccinia Veronicarum DC. Fl. Fr. **2**: 594. 1805.
Puccinia Veronicarum fragilipes Körn. Hedwigia **16**: 1. 1877.
Puccinia Veronicarum persistens Körn. Hedwigia **16**: 1. 1877.
Puccinia Veronicae Wint. in Rab. Krypt.-Fl. 1^1: 166. 1881. Not *P. Veronicae* Schroet. 1879, nor Schum. 1880.
Dicaeoma Veronicarum Kuntze, Rev. Gen. 3^3: 471. 1898.
Leptopuccinia Veronicarum Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, scattered and solitary or more commonly gregarious and more or less confluent in small groups 1–3 mm. across, small, 0.2–0.5 mm. in diameter, early naked, pulverulent sori chestnut-brown, often arranged in concentric manner around a central pulvinate sorus, pulvinate sori cinnamon-brown, becoming cinereous by germination; teliospores ellipsoid, oblong, or oblong-terete, 16–19 by 32–45 μ, rounded or obtuse above, rounded or more commonly narrowed below, usually noticeably constricted at septum; wall golden- or light cinnamon-brown, 1.5–3 μ thick, paler and thickened above, 4–7 μ, smooth; pedicel colorless, short, deciduous or in pulvinate sori equaling spore.

ON SCROPHULARIACEAE:
Leptandra virginica (L.) Nutt. (*Veronica virginica* L.), Iowa, Wisconsin.
TYPE LOCALITY: France, on *Veronica Ponae*.
DISTRIBUTION: Iowa and Wisconsin; also in Europe.
ILLUSTRATIONS: Ber. Deuts. Bot. Ges. **8**: *pl. 12, f. 12–17;* Beitr. Krypt. Schweiz 2^2: *f. 236;* Fl. Ital. Crypt Ured. *f. 60a, b;* Bull. Lab. Nat. Hist. Univ. Iowa 3^2: *pl. 2, f. 9a, b;* Grove, Brit. Rust Fungi *f. 120*.
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *9a, b;* Barth. N. Am. Ured. *1675*.

108. **Micropuccinia albulensis** (P. Magn.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Veronicae Schum.; Wint. Hedwigia **19**: 164. 1880. Not *P. Veronicae* Schroet. 1879.
Puccinia albulensis P. Magn. Ber. Deuts. Bot. Ges. **8**: 169. 1890.
Dicaeoma albulense Kuntze, Rev. Gen. 3^3: 467. 1898.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous and caulicolous, chiefly from a distributed mycelium, evenly disposed over considerable areas of internodes and leaves, small, round, 0.2–0.4 mm. across,

occasionally confluent, early naked, pulverulent, or compact in germinating sori, ruptured epidermis not conspicuous, cinnamon-brown, becoming cinereous by germination, more rarely solitary or gregarious and then usually larger, 0.5–0.8 mm. across, pulverulent, with ruptured epidermis conspicuous; teliospores ellipsoid or somewhat fusiform, 14–18 by 24–34 μ, rounded or obtuse above, rounded or narrowed below, not or slightly constricted at septum; wall golden- or light cinnamon-brown, thin, 1–1.5 μ, thickened 3–5 μ above, smooth or very minutely verrucose-rugose, best observed when dry; pedicel colorless, short, deciduous, or in pulvinate sori twice length of spore.

ON SCROPHULARIACEAE:
Veronica Cusickii A. Gray, Washington.
Veronica Wormskjoldii R. & S. (*V. alpina unalaschkensis* Cham. & Schlecht.), Colorado, Montana, Oregon, Utah, Wyoming; Greenland; British Columbia.
TYPE LOCALITY: Canton Graubunden, Switzerland, on *Veronica alpina*.
DISTRIBUTION: Western Colorado and central Utah northward to southern British Columbia, and in Greenland; also in Europe.
ILLUSTRATIONS: Ber. Deuts. Bot. Ges. 8: *pl. 12, f. 1–11;* Beitr. Krypt. Schweiz 2^2: *f. 237*.
EXSICCATI: Ellis & Ev. Fungi Columb. *1462;* Garrett, Fungi Utah. *94;* D. Griff. W. Am. Fungi *357*.

109. **Micropuccinia Wulfeniae** (Dietel & Holway) Arthur & Jackson.

Puccinia Wulfeniae Dietel & Holway; Dietel, Erythea **3**: 79. 1895.
Puccinia Synthyridis Ellis & Ev. Bull. Torrey Club **27**: 61. 1900.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous and caulicolous, at first chiefly hypophyllous, solitary or densely gregarious and often confluent in small groups 2–5 mm. across, on discolored spots, becoming scattered on both surfaces of leaf, round, 0.2–0.8 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis usually conspicuous, germinating sori pulvinate, becoming cinereous; teliospores oblong or ellipsoid, 14–18 by 26–35 μ, rounded or obtuse above, rounded below, strongly constricted at septum; wall golden-brown, 1–1.5 μ thick, abruptly thickened at apex by a sub-hyaline papilla over pore, 4–6 μ, obscurely verrucose or verrucose-rugose, especially in the upper part, best observed when dry, or smooth; pedicel colorless, short, deciduous, or in pulvinate sori once to once and a half length of spore; mesospores occasionally intermixed.

ON SCROPHULARIACEAE:
Besseya rubra (Dougl.) Rydb. (*Synthyris rubra* Benth.), Washington.
Besseya wyomingensis (A. Nelson) Rydb. (*Wulfenia wyomingensis* A. Nelson, *Synthyris wyomingensis* A. Heller), Wyoming.
Synthyris cordata (A. Gray) A. Heller (*Wulfenia cordata* A. Gray), California.
Synthyris major (Hook.) A. Heller, Idaho.
Synthyris reniformis (Dougl.) Benth. (*Wulfenia reniformis* Dougl.), Idaho.
Synthyris rotundifolia A. Gray, California, Oregon.
TYPE LOCALITY: Ukiah, Mendocino County, California, on *Wulfenia cordata*.
DISTRIBUTION: Northwestern Wyoming to eastern Washington and central California.
ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 17, f. 241, 244*.
EXSICCATI: Ellis & Ev. Fungi Columb. *1465*.

110. **Micropuccinia depallens** (Arth. & Holway) Arthur & Jackson.

Puccinia depallens Arth. & Holway; Arth. Mycologia **10**: 139. 1918.

O. Pycnia epiphyllous, gregarious on discolored areas 2–3 mm. across, light-brown becoming dark-brown, conspicuous, subcuticular, lenticular or low-conic, 128–160 μ in diameter, 48–77 μ high; ostiolar filaments none; pycniospores ellipsoid, colorless, 2.5 by 3–4 μ.

III. Telia hypophyllous, crowded in circles on spots opposite the pycnia, early naked, oval, 0.2–0.4 mm. long, compact, light cinnamon-brown or cinereous from the germinating spores, ruptured epidermis inconspicuous; teliospores terete, 16–27 by 45–96 μ, obtuse or rounded at both ends, slightly or not constricted at septum, which is more or less oblique; wall colorless or slightly tinted, uniformly thin, 1 μ, smooth; pedicel one-half length of spore or nearly equaling it, colorless, firm, broad, thin-walled.

ON BIGNONIACEAE:
Pithecoctenium muricatum DC., Costa Rica; Guatemala.
TYPE LOCALITY: Road to Volcán de Poás, Costa Rica, on *Pithecoctenium muricatum*.
DISTRIBUTION: Central America.

111. **Micropuccinia Elytrariae** (P. Henn.) Arthur & Jackson.

Puccinia Elytrariae P. Henn. Hedwigia 34: 320. 1895.

O. Pycnia not seen, probably not formed.

III. Telia hypophyllous, gregarious and closely crowded on discolored spots 4–10 mm. across, round, small, 0.1–0.4 mm. in diameter, somewhat tardily naked, compact, somewhat pulvinate, chocolate-brown, ruptured epidermis noticeable; teliospores few, ellipsoid or obovoid, 14–19 by 22–30 μ, rounded above, rounded or narrowed below, not constricted at septum; wall cinnamon-brown, 1.5–2.5 μ thick, darker and slightly thickened above, 5 μ, smooth; pedicel firm, concolorous with base of spore, often slightly inflated above, once to twice and a half length of spore, or deciduous; mesospores predominating, obovoid or ellipsoid, 14–19 by 18–24 μ, rounded above, usually narrowed below.

ON ACANTHACEAE:
Elytraria squamosa (Jacq.) Lindau, Costa Rica.
Elytraria tridentata Vahl, Guerrero, Jalisco, Morelos.
Elytraria sp., Guatemala.
TYPE LOCALITY: Brazil, on *Elytraria crenata*.
DISTRIBUTION: Central Mexico southward into Central America; also in South America.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 15, f. 213.*

112. **Micropuccinia rubefaciens** (Johans.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia rubefaciens Johans. Bot. Notiser **1886**: 174. 1886.
Dicaeoma rubefaciens Kuntze, Rev. Gen. 3^3: 470. 1898.
Dasyspora rubefaciens Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Leptopuccinia rubefaciens Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous and caulicolous, solitary or gregarious and more or less confluent in groups 1–10 mm. across, on yellowish spots, large, round or elliptic, 1–2 mm. or larger when confluent, compact, somewhat pulvinate, tardily naked, blackish-brown, ruptured epidermis conspicuous; teliospores oblong or clavate, 16–23 by 38–52 μ, rounded or truncate above, narrowed below, slightly constricted at septum; wall cinnamon-brown, thin at sides, 1.5–2 μ, dark chestnut-brown above and greatly thickened, 10–14 μ, smooth; pedicel colorless, or tinted like base of spore, half length of spore or shorter.

This species is correlated with *Dicaeoma punctatum* (Link) Arth. and *Allodus ambigua* (Alb. & Schw.) Arth. The morphological characters of like stages in the three species are similar or identical, and together with the correspondence in hosts doubtless indicate a common origin.

ON RUBIACEAE:
Galium boreale L. (*G. boreale linearifolium* Rydb.), Alaska, Colorado, Idaho, Iowa, Montana, North Dakota, Oregon, South Dakota, Washington, Wisconsin; Alberta.
Galium californicum Hook. & Arn., California.
TYPE LOCALITY: Jemtland, Sweden, on *Galium boreale*.
DISTRIBUTION: Southern Wisconsin to Colorado and central California, northwestward nearly to Bering Straits, Alaska; also in northern Europe.
ILLUSTRATIONS: Sydow, Monog. Ured. 1: *pl. 13, f. 196;* Hedwigia **28**: 106. *f. 5.*
EXSICCATI: Barth. N. Am. Ured. *965, 1368, 1865;* Brenckle, Fungi Dak. *16, 244;* Ellis, N. Am. Fungi *1038a;* D. Griff. W. Am. Fungi *294;* Sydow, Ured. *2275.*

113. **Micropuccinia lateritia** (Berk. & Curt.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia lateritia Berk. & Curt. Jour. Acad. Phila. II. **2**: 281. 1853.
Puccinia Spermacoces Berk. & Curt. Grevillea **3**: 53. 1874.
Dicaeoma Spermacoceodis Kuntze, Rev. Gen. 3^3: 467. 1898.
Dicaeoma lateritium Kuntze, Rev. Gen. 3^3: 469. 1898.
Dicaeoma Spermacoces Kuntze, Rev. Gen. 3^3: 470. 1898.
Puccinia Houstoniae Sydow, Hedwigia Beibl. **40**: 126. 1901.
Allodus Houstoniae Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.
Dasyspora lateritia Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, rarely epiphyllous, solitary or more commonly gregarious in groups 0.2–1 cm. across, often circinating, small, round, 0.1–0.4 mm. across, early naked, compact, sometimes pulvinate, less commonly somewhat pulverulent, cinnamon- or chestnut-brown, in germinating sori becoming cinereous, ruptured epidermis not noticeable; teliospores broadly ellipsoid, oblong, or obovoid, 16–23 by 26–40 μ, rounded above, rounded or occasionally somewhat narrowed below, not constricted at septum; wall golden- or chestnut-brown, 2.5–4 μ thick, slightly thickened above, 4–7 μ, smooth; pedicel colorless, often slightly tinted, usually persistent, once to twice length of spore, occasionally longer.

ON RUBIACEAE:

Borreria ocimoides (Burm. f.) DC., Costa Rica.
Borreria laevis (Lam.) Griseb., Jamaica; Cuba; Porto Rico.
Borreria parviflora G. Meyer, St. Croix.
Borreria terminalis Small, Florida.
Borreria verticillata (L.) G. Meyer, Porto Rico.
Bouvardia sp., Morelos.
Coccocypselum hirsutum Bartl., Costa Rica.
Crusea calocephala DC., Guatemala.
Crusea sp., Morelos.
Diodella rigida (Cham. & Schlecht.) Small (*Diodia rigida* Cham. & Schlecht.), Florida; Colima; Cuba; Haïti; Porto Rico.
Diodia littoralis Sw., Porto Rico.
Diodia maritima Thonn., Porto Rico.
Diodia sp., Veracruz; Guatemala.
Ernodea angusta Small, Florida.
Ernodea littoralis Sw., Florida; Bahamas; Mona Island; Porto Rico.
Hemidiodia ocimifolia (Willd.) K. Schum., Cuba.
Houstonia angustifolia Michx., Texas.
Mitracarpus portoricensis Urban, Porto Rico.
Spermacoce glabra Michx., Alabama, Louisiana.
Spermacoce Haenkeana Hemsl., Michoacan.
Spermacoce podocephala DC., Guatemala.
Spermacoce Pringlei S. Wats., Oaxaca.
Spermacoce riparia Cham. & Schlecht., Porto Rico.
Spermacoce tenuior (L.) Lam., Jamaica; Porto Rico; St. Croix.

TYPE LOCALITY: Surinam, on *Spermacoce* sp., now interpreted as probably *Borreria laevis*.

DISTRIBUTION: Along the Gulf of Mexico from Florida to Texas and southward through Central America and the West Indies; also in South America.

ILLUSTRATION: Bot. Jahrb. **17**: *pl. 12, f. 1, 2*.

EXSICCATI: Barth. Fungi Columb. *2455, 4854;* Barth. N. Am. Ured. *44, 153, 1555, 1557;* Ellis & Ev. N. Am. Fungi *1841;* Rav. Fungi Car. **3**: *93*.

114. **Micropuccinia Linkii** (Klotzsch) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Linkii Klotzsch, Linnaea **8**: 490. 1833.
Puccinia Pringlei Peck, Bot. Gaz. **6**: 275. 1881.
Dicaeoma Linkii Kuntze, Rev. Gen. **3**^{3}: 469. 1898.
Dicaeoma Pringlei Kuntze, Rev. Gen. **3**^{3}: 470. 1898.

O. Pycnia unknown.

III. Telia amphigenous on petioles and veins, chiefly epiphyllous, when on blade of leaf deep-seated and gregarious on thickened nearly orbicular purplish spots 0.5–1 cm. across, or when on veins and petioles elongated to 2 cm., causing some hypertrophy, roundish, 0.2–0.5 mm. across or larger through coalesence, early naked, somewhat pulverulent, blackish-brown, ruptured epidermis noticeable; teliospores ellipsoid, 18–22 by 32–44 μ, rounded or obtuse above, rounded or somewhat narrowed below, not or slightly constricted at septum; wall chestnut-brown, 2–3 μ thick, thickened above by a broad sub-hyaline conic umbo, 5–7 μ, similarly thickened over pore of lower cell at septum, striate with prominent sparsely distributed sub-hyaline cylindric papillae, 1–2 mm. high, arranged in 3–5 longitudinal or oblique lines; pedicel colorless, usually deciduous or equaling spore.

ON CAPRIFOLIACEAE:

Viburnum pauciflorum Pylaie, Idaho, Michigan, Montana, Washington; Quebec.

TYPE LOCALITY: America borealis [Canada], on *Viburnum* [*pauciflorum*].

DISTRIBUTION: In proximity to the international boundary from eastern Canada to the Pacific coast.

ILLUSTRATIONS: Linnaea 8: *pl. 3;* Sydow, Monog. Ured. **1**: *pl. 13, f. 189*.

EXSICCATI: Barth. N. Am. Ured. *550;* Rel. Farl. *259*.

115. **Micropuccinia Symphoricarpi** (Hark.) Arthur & Jackson.

Puccinia Symphoricarpi Hark. Bull. Calif. Acad. 1: 35. 1884.
Dicaeoma Symphoricarpi Kuntze, Rev. Gen. 3³: 470. 1898.

O. Pycnia unknown.

III. Telia amphigenous, chiefly hypophyllous, closely gregarious and more or less confluent on yellowish spots 0.4–0.8 cm. across, often causing some hypertrophy, roundish, 0.4–1 mm. across, tardily naked, compact, pulvinate, blackish-brown, long covered by the cinereous epidermis; teliospores ellipsoid, oblong, or oblong-clavate, often somewhat irregular, 18–24 by 34–56 μ, rounded or obtuse above, rounded, truncate, or narrowed to the pedicel below, slightly constricted at septum; wall cinnamon-brown, 1.5–3 μ thick, thickened above, 7–13 μ, somewhat thickened over pore of lower cell at septum, smooth; pedicel firm, tinted, equaling spore or shorter; mesospores occasionally intermixed.

This species is correlated with *Dicaeoma abundans* (Peck) Arth. & Fromme, the telial characters of the two species being similar or identical, and the hosts of the short-cycled form corresponding with the aecial hosts of the heteroecious form. This agreement doubtless indicates a common origin for the two species.

ON CAPRIFOLIACEAE:
Symphoricarpos albus (L.) Blake (*S. racemosus* Michx.), California, Montana, Oregon, Washington; British Columbia.
Symphoricarpos mollis Nutt., California.
TYPE LOCALITY: Mt. Tamalpais, California, on *Symphoricarpos mollis*.
DISTRIBUTION: Mountains of British Columbia to central California and western Montana.
EXSICCATI: Barth. Fungi Columb. *4867;* Barth. N. Am. Ured. *266, 574, 1373, 1873, 2168;* Ellis, N. Am. Fungi *1057;* Ellis & Ev. Fungi Columb. *488;* Sydow, Ured. *885.*

116. **Micropuccinia Apocyni** (Dietel & Holway) Arthur & Jackson.

Puccinia Apocyni Dietel & Holway; Holway, Bot. Gaz. 24: 33. 1897.

O. Pycnia unknown.

III. Telia hypophyllous, numerous, gregarious and crowded in groups 3–8 mm. across, on yellowish spots, roundish, small, 0.2–0.4 mm. in diameter, early naked, compact, pulvinate cinnamon-brown becoming cinereous by germination, ruptured epidermis not noticeable; teliospores cylindric or clavate-cylindric, 16–19 by 36–48 μ, obtuse or acute above, rounded or more commonly narrowed to pedicel below, strongly constricted at septum; wall golden-brown, 1–1.5 μ thick, thickened above, 8–12 μ, smooth; pedicel fragile, colorless, short.

ON CAPRIFOLIACEAE:
Lonicera pilosa H.B.K., Mexico (state).
TYPE LOCALITY: Eslava, near City of Mexico, on "*Apocynum androsaemifolium*," error for *Lonicera pilosa*.
DISTRIBUTION: Vicinity of the type locality.

117. **Micropuccinia Adoxae** (Hedw. f.) Arth. & Jackson; Arth. Bull. Torrey Club 48: 40. 1921.

Puccinia Adoxae Hedw. f.; DC. Fl. Fr. 2: 220. 1805.
Dicaeoma Adoxae S. F. Gray, Nat. Arr. Brit. Pl. 1: 543. 1821.
Dasyspora Adoxae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown.

III. Telia amphigenous, from a perennial mycelium, gregarious in groups of various size, often scattered on swollen petioles and stems, round, 0.5 mm. across, early naked, pulverulent, chestnut-brown, ruptured epidermis somewhat noticeable; teliospores ellipsoid or oblong, 15–20 by 24–38 μ, rounded or somewhat obtuse above with a prominent hyaline umbo covering the pore, rounded, obtuse, or narrowed below, scarcely constricted at septum; wall cinnamon-brown, moderately thin, 1.5–2 μ, slightly thickened above, 3–5 μ, smooth; pedicel colorless, fragile, about length of spore, usually deciduous.

This species is correlated with *Dicaeoma Nolitangeris* (Corda) Arth., the telia of the two species having the same morphological characters, and the host of the short-cycled form being the same as that of the aecia of the heteroecious form. This agreement doubtless indicates a common origin.

ON ADOXACEAE:
Adoxa moschatellina L., Colorado, Utah.
TYPE LOCALITY: Near Geneva, Switzerland, on *Adoxa moschatellina*.
DISTRIBUTION: Central Colorado to southeastern Utah; also in Europe.
ILLUSTRATIONS: Ber. Deuts. Bot. Ges. 9: *pl. 3, f. 12;* Beitr. Krypt. Schweiz 2^2: *f. 111;* Grove, Brit. Rust Fungi *f. 112*.
EXSICCATI: Clements, Crypt. Form. Colo. *133;* Ellis & Ev. N. Am. Fungi *2247;* Garrett, Fungi Utah. *211*.

118. **Micropuccinia Campanulae** (Carm.) Arthur & Jackson.

Puccinia Campanulae Carm.; Berk. in Smith, Engl. Fl. 5^2: 356. 1836.
Dicaeoma Campanulae Kuntze, Rev. Gen. 3^3: 468. 1898.

O. Pycnia unknown.

III. Telia amphigenous, chiefly hypophyllous and caulicolous, scattered or frequently gregarious, round, 0.4–0.8 mm. across, tardily naked, pulverulent, cinnamon-brown, ruptured epidermis persistent and conspicuous; teliospores oblong or ellipsoid, 14–18 by 26–38 μ, rounded or obtuse above and below, somewhat constricted at septum; wall golden-brown, moderately thin, 1.5–2.5 μ, thickened above, 4–6 μ, often with sub-hyaline apiculus, smooth; pedicel very delicate, colorless, half length of spore, more often deciduous.

ON CAMPANULACEAE:
Campanula rotundifolia L., New York.
Campanula Scouleri Hook., Oregon.
Campanula uniflora L., Greenland.
TYPE LOCALITY: Appin, Scotland, on *Campanula* sp.
DISTRIBUTION: Locally in New York, Oregon, and Greenland; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 136;* Jahrb. Nass. Ver. Nat. **23–24**: *pl. 2, f. 14;* Sydow, Monog. Ured. **1**: *pl. 12, f. 182;* Grove, Brit. Rust Fungi *f. 111*.

119. **Micropuccinia Lobeliae** (W. Gerard) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia microsperma Berk. & Curt.; M. A. Curt. Cat. Pl. N. Car. 121, hyponym. 1867.
Puccinia Lobeliae W. Gerard; Peck, Bull. Buffalo Soc. Nat. Sci. **1**: 66. 1873.
Puccinia microsperma Berk. & Curt. Grevillea **3**: 55. 1874.
Dicaeoma microspermum Kuntze, Rev. Gen. 3^3: 469. 1898.
Dicaeoma Lobeliae Arth. Proc. Ind. Acad. Sci. **1898**: 183. 1899.
Dasyspora Lobeliae Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown.

III. Telia hypophyllous, rarely epiphyllous, closely gregarious in groups 0.5–1.5 cm. across, occasionally becoming locally systemic and covering large areas of the leaf-surface, small, round, 0.2–0.5 mm. across, early naked, pulvinate, cinnamon- or chestnut-brown, becoming cinereous by germination, ruptured epidermis not conspicuous; teliospores oblong or cylindric, 14–18 by 30–44 μ, obtuse above and below or occasionally narrowed to pedicel, constricted at septum; wall nearly colorless or golden-brown, thin, 1–1.5 μ, thickened at apex, 3–7 μ, smooth; pedicel very delicate, colorless, equaling spore or more commonly deciduous.

ON LOBELIACEAE:
Lobelia Kalmii L., New York.
Lobelia puberula Michx., Alabama, North Carolina, South Carolina.
Lobelia syphilitica L., Arkansas, Delaware, Illinois, Indiana, Iowa, Kentucky, Missouri, Nebraska, New York, Pennsylvania, West Virginia, Wisconsin; Ontario.
TYPE LOCALITY: Poughkeepsie, New York, on *Lobelia syphilitica*.
DISTRIBUTION: Northern New York to South Carolina, and westward to central Nebraska and northwestern Arkansas.
ILLUSTRATION: Bull. Lab. Nat. Hist. Univ. Iowa 3^2: *pl. 1, f. 3*.
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *3;* Barth. Fungi Columb. *2564, 2858, 3257;* Barth. N. Am. Ured. *46, 2253;* Ellis, N. Am. Fungi *253;* Ellis & Ev. Fungi Columb. *261;* Sydow, Ured. *774, 2524*.

120. **Micropuccinia Xanthii** (Schw.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia Xanthii Schw. Schr. Nat. Ges. Leipzig **1**: 73. 1822.
Puccinia Xanthii Ambrosiae Berk. & Rav.; Rav. Fungi Car. **3**: 91, hyponym. 1855.
Dasyspora Xanthii Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Leptopuccinia Xanthii Sydow, Ann. Myc, **20**: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, less commonly epiphyllous, rarely caulicolous, closely gregarious

and often confluent in groups 0.1–1 cm. across, on yellowish or purplish spots, small, round, 0.2–0.5 mm. across, early naked, compact, at first punctate becoming pulvinate, blackish-brown becoming cinereous by germination, ruptured epidermis not conspicuous; teliospores oblong, cylindric or clavate, often somewhat irregular, 13–19 by 35–55 μ, rounded, obtuse, or acute above, narrowed below, usually noticeably constricted at septum; wall golden- or cinnamon-brown, 1.5–2.5 μ thick, usually darker and thickened above, 4–9 μ, smooth; pedicel colorless or tinted like spore, firm, one half length of spore or shorter.

This species is correlated with *Dicaeoma canaliculatum* (Schw.) Kuntze, the telial characters of the two species being similar or identical, and the hosts of the short-cycled species corresponding with the aecial hosts of the heteroecious species. This agreement doubtless indicates a common origin of the two species.

ON AMBROSIACEAE:

Ambrosia elatior L. (*A. artemisiaefolia* A. Gray not L.), Florida, Kansas, Nebraska, South Carolina, Texas.
Ambrosia media Rydb., Colorado.
Ambrosia psilostachya DC., Colorado, Kansas, Montana, Nebraska, South Dakota.
Ambrosia trifida L., Arkansas, Colorado, Delaware, Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, New York, Oklahoma, Pennsylvania, South Dakota, Texas, Virginia, West Virginia, Wisconsin; Ontario.
Xanthium acerosum Greene, Minnesota, North Dakota.
Xanthium cenchroides Millsp. & Sherff, Colorado.
Xanthium chinense Mill. (*X. longirostre* Wallr., *X. glabratum* Britton, *X. canadense* Am. Auth. not Mill., *X. americanum* Am. Auth. not Walt., *X. strumarium* Am. Auth. not L.), Alabama, Arkansas, Indiana, Kansas, Kentucky, New York, North Carolina, Oklahoma, Pennsylvania, Virginia; Ontario; Cuba; Porto Rico; Santo Domingo.
Xanthium echinatum Murr., New York.
Xanthium inflexum Mackenzie & Bush, Missouri.
Xanthium italicum Mor. (*X. commune* Britton, *X. glanduliferum* Greene), Arkansas, California, Colorado, Indiana, Iowa, Nebraska, New Mexico, New York, North Dakota, Oklahoma, Pennsylvania, South Dakota; Querétaro; Cuba.
Xanthium pennsylvanicum Wallr. (*X. californicum* Greene, *X. saccharatum* Wallr.), California, Colorado, Indiana, Michigan, Missouri, Nebraska, Oklahoma, Tennessee; Cuba.
Xanthium spinosum L., Indiana.
Xanthium sp., Arizona, Delaware, Florida, Idaho, Illinois, Louisiana, Maryland, Massachusetts, Minnesota, Mississippi, Montana, New Jersey, Ohio, Rhode Island, South Carolina, Texas, Washington, West Virginia, Wisconsin, Wyoming; Jalisco, Morelos, Oaxaca.

TYPE LOCALITY: North Carolina, on *Xanthium strumarium*.

DISTRIBUTION: Canada and the United States east of the Rocky Mountains southward through the West Indies, and from central California to southern Mexico; also in Hawaii.

ILLUSTRATIONS: Ann. Rep. N. Y. State Mus. **25**: *pl. 2, f. 22;* Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 2, f. 10a, b.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *10a–c;* Barth. Fungi Columb. *2678, 2779, 2780, 2781, 2866, 2901, 3075, 3272, 3375, 3676, 3975, 4576, 4679, 4982;* Barth. N. Am. Ured. *74, 175, 279, 375, 376, 481, 674, 675, 777, 778, 1085, 1276, 1378, 1576, 1577, 1578, 1678, 1781, 1782, 1880, 1978, 2080, 2081, 2177, 2276, 2277, 2476, 2634;* Brenckle, Fungi Dak. *470;* Carleton, Ured. Am. *34;* Clements, Crypt. Form. Colo. *327, 582;* Ellis, N. Am. Fungi *264;* Ellis & Ev. Fungi Columb. *344, 1456, 1582, 1871;* Ellis & Ev. N. Am. Fungi *1853;* D. Griff. W. Am. Fungi *73, 73a, 82;* Kellerm. Ohio Fungi *32;* Kellerm. & Swingle, Kans. Fungi *17a, b;* Rav. Fungi Am. *730;* Rav. Fungi Car. **1**: *95*, **3**: *91;* Seym. & Earle, Econ. Fungi *322a, b;* Shear, N. Y. Fungi *120;* Sydow, Ured. *487, 1033, 1087, 1185;* Thümen, Myc. Univ. *33.*

121. **Micropuccinia rotundata** (Dietel) Arthur & Jackson.

Puccinia rugosa Speg. Anal. Soc. Ci. Argent. **17**: 92. 1884. Not *P. rugosa* Billings, 1871.
Puccinia rotundata Dietel, Hedwigia **36**: 32. 1897.
Dicaeoma rugosum Kuntze, Rev. Gen. **3**[3]: 470. 1898.

O. Pycnia amphigenous, among the telia, few, gregarious, noticeable, yellowish, globoid or somewhat flask-shaped, 125–130 μ in diameter; ostiolar filaments not extruded.

III. Telia amphigenous or chiefly epiphyllous and caulicolous, numerous, crowded on yellowish spots in orbicular or somewhat irregular areas 0.5–5 mm. across, roundish, 0.2–0.5 mm. in diameter, tardily naked, becoming pulverulent, reddish-brown, ruptured epidermis conspicuous; teliospores ellipsoid, 18–26 by 30–42 μ, rounded at both ends, occasionally tapering below, not or slightly constricted at septum, cells easily separating; wall cinnamon-brown, uniformly thick, 2.5–3 μ, occasionally thickened 4–5 μ over each pore, located about half way from apex to septum in upper cell and similarly placed between pedicel and septum in lower cell, noticeably and evenly rugose; pedicel short, colorless, deciduous.

This species is correlated with *Bullaria inaequata* (Jackson & Holway) Arth. & Mains,

the pycnia and telia of the two species being morphologically similar, and the hosts the same. The two species are undoubtedly of the same origin.

ON CARDUACEAE:
Vernonia patens H.B.K., Costa Rica.
Vernonia sp., Panama.
TYPE LOCALITY: Paraguarí, Paraguay, on Compositae (Verbesinae?), now interpreted as *Vernonia* sp.
DISTRIBUTION: Central America; also in South America.

122. **Micropuccinia discreta** (Jackson & Holway) Arthur & Jackson.

Puccinia discreta Jackson & Holway; H. S. Jackson, Bot. Gaz. **65**: 309. 1918.

O. **Pycnia** epiphyllous, surrounded by the telia, few, gregarious, noticeable, golden-brown fading to dark-brown, globose or depressed-globoid, 90–100 by 100–130 μ; ostiolar filaments short.

III. Telia chiefly epiphyllous, densely gregarious and confluent in groups 0.5–3 mm. across, on yellowish hypertrophied spots, often arranged in a concentric manner around the pycnia, roundish or somewhat irregular, 0.2–0.6 mm. across, early naked, at first punctiform, becoming pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; teliospores ellipsoid, 18–22 by 32–42 μ, rounded at both ends, cells easily separating, strongly constricted at septum; wall dark cinnamon-brown, uniform in thickness, 2.5–3.5 μ, minutely verrucose-rugose, often in lines extending in various directions, the pore of apical cell placed about half way from apex to septum, similarly in lower cell; pedicel colorless, usually deciduous.

ON CARDUACEAE:
Vernonia stellaris Llave & Lex. (*V. Deppeana* Less.), Costa Rica; Guatemala.
TYPE LOCALITY: San José, Costa Rica, on *Vernonia Deppeana*.
DISTRIBUTION: Central America.

123. **Micropuccinia paupercula** (Arth.) Arthur & Jackson.

Puccinia paupercula Arth. Bot. Gaz. **40**: 206. 1905.
Puccinia Elephantopodis-spicati Pat. Bull. Soc. Myc. Fr. **28**: 140. 1912.

O. Pycnia unknown.

III. Telia hypophyllous, crowded in orbicular groups 1–4 mm. across, minute, punctiform, confluent, soon naked, compact, chocolate-brown, usually cinereous by germination, ruptured epidermis inconspicuous; teliospores oblong or lance-oblong, 15–17 by 39–50 μ, acute or obtuse at apex, obtuse or narrowed at base, slightly or not constricted at septum; wall chestnut-brown, smooth, rather thin, 1–2 μ, thicker at apex, 7–9 μ, concolorous; pedicel colored like the spore, firm, one half length of spore or less.

ON CARDUACEAE:
Pseudelephantopus spicatus (Juss.) Rohr (*Distreptus spicatus* Cass., *Elephantopus spicatus* Juss.), Veracruz; Costa Rica; Guatemala; Panama.
TYPE LOCALITY: Veracruz, Mexico, on *Elephantopus spicatus*.
DISTRIBUTION: Southern Mexico and Central America.

124. **Micropuccinia tolimensis** (Mayor) Arthur & Jackson.

Puccinia tolimensis Mayor, Mém. Soc. Neuch. Sci. Nat. **5**: 516. 1913.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, densely gregarious and often confluent, in orbicular groups 2–5 mm. across, on purplish spots, punctiform, 0.1–0.2 mm. across, tardily naked, compact, pulvinate, chocolate-brown, ruptured epidermis conspicuous; teliospores clavate or oblong, 16–23 by 40–58 μ; apex variable, rounded, truncate, or obtuse, base narrowed or rarely somewhat rounded, usually constricted at septum; wall golden- or light cinnamon-brown, thin, 1 μ, thickened and darker at apex, 3–7 μ, smooth; pedicel fragile, short, colorless or tinted like the spore.

This species is correlated with *Dicaeoma Eleocharidis* (Arth.) Kuntze, the telial characters of the two species being essentially the same and the hosts of the short-cycled species corresponding with the aecial hosts of the heteroecious species. This agreement doubtless indicates a common origin for the two species.

ON CARDUACEAE:
Eupatorium pansamalense B. L. Robinson, Guatemala.
Eupatorium urticaefolium Reichard (*E. ageratoides* L. f.), New York.
TYPE LOCALITY: Central Andes, Soledad, Tolima, Colombia, on *Eupatorium* sp.
DISTRIBUTION: Guatemala and one locality in central New York; also in South America.
ILLUSTRATION: Mém. Soc. Neuch. Sci. Nat. 5: *f. 40.*

125. **Micropuccinia praemorsa** (Dietel & Holway) Arth. & Jackson; Arth. Bull. Torrey Club 48: 41. 1921.

Puccinia praemorsa Dietel & Holway; Holway, Bot. Gaz. **31**: 332. 1901.
Dasyspora praemorsa Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Leptopuccinia praemorsa Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, crowded and partly confluent in more or less circular groups 1–4 mm. across, small, 0.2–0.4 mm. across, early naked, compact, pulvinate, chocolate-brown, ruptured epidermis not conspicuous; teliospores oblong or clavate, somewhat irregular, 18–24 by 45–64 μ, rounded or acute above, narrowed below, somewhat constricted at septum; wall chestnut-brown above, cinnamon-brown below, 2.5–3.5 μ thick, slightly thickened above, 4–7 μ, smooth; pedicel concolorous with base of spore, firm, one fourth to one half length of spore.

ON CARDUACEAE:
Coleosanthus veronicaefolia (H.B.K.) Kuntze (*Brickellia veronicaefolia* A. Gray), Oaxaca, Pueblo.
TYPE LOCALITY: Oaxaca, Mexico, on *Brickellia veronicaefolia.*
DISTRIBUTION: Southern Mexico.
ILLUSTRATION: Sydow, Monog. Ured. 1: *pl. 3, f. 32.*

126. **Micropuccinia Spegazzinii** (De-Toni) Arth. & Jackson; Arth. Bull. Torrey Club 48: 41. 1921.

Puccinia australis Speg. Anal. Soc. Ci. Argent. **10**: 8. 1880. Not *P. australis* Körn. 1876.
Puccinia Spegazzinii De-Toni, in Sacc. Syll. Fung. **7**: 704. 1888.
Dicaeoma Spegazzinii Kuntze, Rev. Gen. 3^3: 470. 1898.
Dasyspora australis Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Puccinia Melothriae Stevens, Bot. Gaz. **43**: 283. 1907.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, crowded in orbicular groups 1–5 mm. across, rarely confluent, round, small, 0.25 mm. or less in diameter, compact, soon naked, cinnamon-brown, ruptured epidermis inconspicuous; teliospores linear-oblong or clavate, 14–18 by 38–60 μ, obtuse or rounded above, narrowed below, slightly or not constricted at septum; wall pale-yellowish, thin, 1 μ, slightly thickened at apex, 2–3 μ, smooth; pedicel colorless, 8–10 μ thick, as long as spore or shorter, often somewhat expanded immediately below attachment to spore.

ON CARDUACEAE:
Mikania cordifolia (L. f.) Willd. (*Willugbaeya cordifolia* Kuntze), Florida; Guatemala.
Mikania scandens (L.) Willd. (*Willugbaeya scandens* Kuntze), Alabama, Florida, Mississippi, North Carolina, Texas; Costa Rica; Cuba; Panama; Porto Rico; Martinique.
TYPE LOCALITY: Boca del Riachuelo, Argentina, on *Mikania scandens periplocifolia.*
DISTRIBUTION: North Carolina to Texas southward through the West Indies and Central America; also in South America.
EXSICCATI: Seym. & Earle, Econ. Fungi Suppl. *B18.*

127. **Micropuccinia Virgaureae** (DC.) Arth. & Jackson; Arth. Bull. Torrey Club 48: 42. 1921.

Xyloma Virgaureae DC. Syn. Pl. 63. 1806.
Xyloma Solidaginis Fries, Obs. Myc. **1**: 199. 1815.
Dothidea Solidaginis Virgaureae Fries, Syst. Myc. **2**: 562. 1822.
Asteroma Virgaureae Libert, Pl. Crypt. *393.* 1837.
Puccinia minutula Peck, Ann. Rep. N. Y. State Mus. **24**: 91. 1872.
Dicaeoma Virgaureae Kuntze, Rev. Gen. 3^3: 471. 1898.
Dasyspora Virgaureae Arth. Résult Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, closely gregarious but not confluent, in irregular or orbicular groups 3–8 mm. across, on discolored spots, small, 0.2–0.3 mm. in diameter, punctiform, often

arranged in radiating or dendritic manner, grayish-black, long covered by the epidermis, surrounded by a thin stroma of small dark cells; teliospores somewhat irregularly oblong or obovate-oblong, 15–22 by 32–56 μ, obtuse, acute, or truncate above, obtuse or narrowed below, slightly or not constricted at septum; wall dark cinnamon-brown, 1.5–2 μ thick, thickened at apex, 4–9 μ, smooth; pedicel nearly colorless or concolorous with base of spore, firm, half length of spore, usually shorter; mesospores occasionally intermixed.

ON CARDUACEAE:
Solidago puberula Nutt., Massachusetts.
Solidago rugosa Mill., New Hampshire.
Solidago ulmifolia Muhl., Michigan, New York.
Solidago sp., Nova Scotia.
TYPE LOCALITY: France, on *Solidago Virgaurea*.
DISTRIBUTION: Nova Scotia to Michigan; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 264;* Corda, Ic. Fung. **4**: *pl. 4, f. 42;* Grove, Brit. Rust Fungi *f. 81;* Krypt.-fl. Brand Pilze **3**: *f. B177;* Fl. Ital. Crypt. Ured. *f. 57b.*
EXSICCATI: Barth. N. Am. Ured. *480*; Rel. Farl. *277a,b.*

128. **Micropuccinia Asteris** (Duby) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia Asteris Duby, Bot. Gall. **2**: 888. 1830.
Puccinia Asteris Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832.
Puccinia Helenii Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832.
Puccinia Tripolii Wallr. Fl. Crypt. Germ. **2**: 223. 1833.
Puccinia Gerardii Peck, Ann. Rep. N. Y. State Mus. **24**: 91. 1872.
Puccinia Asteris purpurascens Cooke & Peck; Peck, Ann. Rep. N. Y. State Mus. **25**: 118. 1873.
Puccinia sclerotioidea Cooke, Grevillea **8**: 35. 1879.
Puccinia Doloris Speg. Anal. Soc. Ci. Argent. **12**: 68. 1881.
Puccinia magnoecia Ellis & Ev. Bull Torrey Club **22**: 59. 1895.
Dicaeoma Asteris Kuntze, Rev. Gen. 3^3: 468. 1898.
Dicaeoma Doloris Kuntze, Rev. Gen. 3^3: 468. 1898.
Dicaeoma Helenii Kuntze, Rev. Gen. 3^3: 469. 1898.
Dasyspora Asteris Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Leptopuccinia Asteris Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, variable, solitary, 0.4–2 mm. across, or more commonly gregarious, distinct, or confluent in groups 0.2–1 cm. across, on discolored spots at first yellowish, sometimes punctate, but usually small, round, 0.2–0.5 mm. in diameter, early naked, compact, often pulvinate, cinnamon- or blackish-brown, becoming cinereous by germination, ruptured epidermis usually conspicuous; teliospores oblong or clavate, 14–23 by 32–55μ, rounded, obtuse, or acute above, rounded or more commonly narrowed to pedicel below, usually slightly constricted at septum; wall golden- or cinnamon-brown, often darker above, 1.5–2.5 μ thick, greatly thickened above, 6–14 μ, smooth; pedicel nearly colorless, firm, equaling spore or commonly shorter; mesospores occasionally intermixed.

This species is correlated with *Nigredo perigynia* (Halsted) Arth. and *Dicaeoma Asterum* (Schw.) Arth. & Kern, the telial characters of the three species being strikingly similar and the hosts of the short-cycled species corresponding with the aecial hosts of the two heteroecious species. This agreement doubtless indicates a common origin for the three species.

ON CARDUACEAE:
Aster acuminatus Michx., New Hampshire, New York, Vermont; Nova Scotia.
Aster adscendens Lindl., Montana, Utah.
Aster azureus Lindl., Indiana, Nebraska.
Aster Burkei (A. Gray) Howell (*A. foliaceus Burkei* A. Gray), Washington.
Aster Canbyi Vasey, Montana, Wyoming.
Aster chilensis Nees (*A. Chamissonis* A. Gray), California.
Aster conspicuus Lindl., Montana, Oregon; Alberta, British Columbia.
Aster cordifolius L., Iowa, Maryland, Mississippi, New Hampshire, New Jersey, New York, Pennsylvania, West Virginia; Ontario.
Aster crassulus Rydb. (*A. hebecladus* Coult. & Nels. not DC.), Colorado, Montana, Wyoming.
Aster Drummondii Lindl., Arkansas.
Aster Eatonii (A. Gray) Howell, Utah.
Aster ericoides L., Kentucky, New York, Pennsylvania.
Aster Fremontii (T. & G.) A. Gray, Washington.
Aster Geyeri (A. Gray) Howell, Montana.
Aster kentuckiensis Britton, Alabama.
Aster laevis L., Colorado, Idaho, New York, Washington; Ontario.
Aster lateriflorus (L.) Britton (*A. diffusus* Ait., *A. miser* Nutt.), Indiana, Iowa, Tennessee, Virginia, West Virginia.
Aster Lowrieanus Porter, Pennsylvania.

Aster lucayanus Britton, Bahamas.
Aster macrophyllus L., Maine, Massachusetts, Michigan, Minnesota, New York, West Virginia, Wisconsin; Nova Scotia, Ontario.
Aster multiflorus Ait., Colorado, Kansas, Nebraska, South Dakota, Wyoming.
Aster nebraskensis Britton, Nebraska.
Aster Novae-Angliae L., Connecticut, Indiana, Iowa, New York, North Dakota; Manitoba.
Aster Novae-Belgii L., Maine, New York; Newfoundland.
Aster oblongifolius Nutt., Kansas, Nebraska.
Aster paniculatus Lam. (*A. paniculatus bellidiflorus* T. & G.), Delaware, Illinois, Indiana, Iowa, Kansas, Michigan, Nebraska, New York, North Dakota, South Dakota, Virginia, Wisconsin.
Aster pauciflorus Nutt., Mexico (state).
Aster prenanthoides Muhl., New York, Pennsylvania, Wisconsin.
Aster puniceus L. (*A. puniceus laeviculmis* A. Gray), Indiana, Iowa; Ontario.
Aster sagittifolius Willd., Pennsylvania.
Aster salicifolius Lam., Arkansas, Delaware, Indiana, Maine, Missouri, New York, Pennsylvania.
Aster Tradescanti L., Missouri.
Aster undulatus L., Massachusetts.
Aster vimineus Lam., New York.
Aster Wootonii Greene, New Mexico.
Aster yosemitanus (A. Gray) Greene (*A. adscendens yosemitanus* A. Gray), California.
Aster sp., North Carolina, Oklahoma, Oregon, Texas; Quebec.
Erigeron bonariensis L., Guatemala.
Erigeron Deamii B. L. Robinson, Guatemala.
Erigeron sp., Costa Rica.
Eucephalus glaucus Nutt. (*Aster glaucus* T. & G.), Wyoming.
Psilactis asteroides A. Gray, New Mexico.

TYPE LOCALITY: France, on *Aster salignus*.

DISTRIBUTION: Newfoundland to British Columbia southward to the Bahamas and Costa Rica; also in Europe.

ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 2, f. 11a, b;* Grove, Brit. Rust Fungi *f. 80;* Krypt.-fl. Brand. Pilze **3**: *f. B122;* Ann. Rep. N. Y. State Mus. **25**: *pl. 2, f. 23, 23a, 24.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *11a, b;* Barth. Fungi Columb. *2348, 2557, 2653, 2755, 2959, 3249, 3544, 4139, 4256, 5051;* Barth. N. Am. Ured. *23, 124, 330, 331, 419, 531, 729, 730, 819, 926, 1133, 1221, 1332, 1472, 1528, 1744, 1832, 1932, 2033, 2137, 2138, 2228, 2229, 2340, 2426, 2537, 2626;* Brenckle, Fungi Dak. *60, 290;* Ellis, N. Am. Fungi *1035, 1045a, b, 1046;* Ellis & Ev. Fungi Columb. *50, 1073, 1385, 1758, 1952;* Garrett, Fungi Utah. *64, 128, 153;* D. Griff. W. Am. Fungi *259, 371, 371a;* Rel. Farl. *242;* Seym. & Earle, Econ. Fungi *478;* Sydow, Ured. *862, 1867, 2410,2512.*

129. **Micropuccinia Grindeliae** (Peck) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Grindeliae Peck, Bot. Gaz. **4**: 127. 1879.
Puccinia variolans Hark. Bull. Calif. Acad. Sci. **1**: 35. 1884.
Puccinia Solidaginis Peck, Bull. Torrey Club **11**: 49. 1884.
Puccinia Tanaceti Actinellae Webber, Bull. Neb. Exp. Sta. **1**: 55. 1889.
Puccinia Bigeloviae Ellis & Ev. N. Am. Fungi *2248*, hyponym. 1889.
Puccinia Gutierreziae Ellis & Ev. Proc. Acad. Sci. Phila. **1893**: 152. 1893.
Puccinia tuberculans Ellis & Ev. Proc. Acad. Sci. Phila. **1893**: 153. 1893.
Puccinia Lygodesmiae Ellis & Ev. Proc. Acad. Sci. Phila. **1893**: 154. 1893.
Puccinia hyalomitra Dietel & Holway; Dietel, Bot. Gaz. **19**: 304. 1894.
Puccinia Erigerontis Ellis & Ev. Bull. Torrey Club **24**: 282. 1897.
Puccinia irregularis Ellis & Tracy, Bull. Torrey Club **24**: 283. Jl 1897. Not *P. irregularis* Dietel, F 1897.
Dicaeoma Bigeloviae Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Dicaeoma Grindeliae Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Gutierreziae Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma hyalomitra Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Lygodesmiae Kuntze, Rev. Gen. **3**[3]: 469. 1898.
Dicaeoma Solidaginis Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dicaeoma tuberculans Kuntze, Rev. Gen. **3**[3]: 471. 1898.
Dicaeoma variolans Kuntze, Rev. Gen. **3**[3]: 471. 1898.
Puccinia Tracyi Sacc. & Sydow, in Sacc. Syll. Fung. **14** : 304. 1899.
Puccinia cornigera Ellis & Ev. Bull. Torrey Club **27**: 462. 1900.
Puccinia Xylorrhizae Arth. Bull. Torrey Club **28**: 662. 1901.
Puccinia Actinellae Sydow, Monog. Ured. **1**: 4. 1902.
Puccinia Aplopappi Sydow, Monog. Ured. **1**: 8. 1902.
Puccinia confluens Sydow, Monog. Ured. **1**: 81. 1902.
Gymnoconia Riddellii D. Griff. Bull. Torrey Club **29**: 296. 1902.
Dasyspora Actinellae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dasyspora Erigerontis Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dasyspora Grindeliae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dasyspora Solidaginis Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Dasyspora tuberculans Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Dasyspora variolans Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Micropuccinia Actinellae Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Micropuccinia Solidaginis Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.
Micropuccinia Lygodesmiae Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.
Micropuccinia tuberculans Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.
Micropuccinia variolans Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.
Micropuccinia Xylorrhizae Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.
Leptopuccinia Actinellae Sydow, Ann. Myc. **20**: 120. 1922.
Leptopuccinia Grindeliae Sydow, Ann. Myc. **20**: 120. 1922.
Leptopuccinia Lygodesmiae Sydow, Ann. Myc. **20**: 120. 1922.
Leptopuccinia tuberculans Sydow, Ann. Myc. **20**: 121. 1922.
Leptopuccinia variolans Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia rare, on certain hosts only, amphigenous, crowded in small groups or scattered among the telia, punctiform, yellowish, inconspicuous, globoid, 100–150 μ in diameter; ostiolar filaments 50–80 μ long, becoming agglutinate.

III. Telia amphigenous or caulicolous, solitary or more commonly gregarious and often more or less confluent in orbicular groups 0.2–1 cm. across, on discolored spots, variable in size, 0.2–1 mm. in diameter, round or elliptic, usually early naked, compact, at first punctate, often becoming pulvinate, dark chocolate-brown or blackish, ruptured epidermis usually conspicuous; teliospores ellipsoid, oblong, or obovate, occasionally irregular, 18–28 by 35–64 μ, rounded, obtuse or acute above, rounded or occasionally narrowed to pedicel below, usually noticeably constricted at septum; wall dark cinnamon- or chestnut-brown, 1.5–3 μ thick, usually greatly thickened above, concolorous or sometimes paler, 4–15 μ, smooth; pedicel colorless or golden-brown, firm, once to thrice length of spore; mesospores and spores with three or more cells occasionally intermixed.

On some hosts, especially when accompanied by pycnia, with a few detached peridial cells and aeciospores within the telia, best seen in young sori; peridial cells colorless, globoid, 24–36 by 26–48 μ, closely and coarsely tuberculate; aeciospores globoid, 16–26 by 20–32 μ; wall golden-brown, 1.5–3 μ thick, finely verrucose.

This species is correlated with *Dicaeoma Stipae* (Arth.) Kuntze, the telial characters of the two species being essentially the same and the hosts of the short-cycled species corresponding to the aecial hosts of the heteroecious species. This agreement doubtless indicates a common origin for the two species.

ON CARDUACEAE:
Chrysoma laricifolia (A. Gray) Greene (*Aplopappus laricifolius* A. Gray), Arizona.
Chrysopsis Bakeri Greene, Colorado, Utah.
Chrysopsis Berlandieri Greene (*C. villosa canescens* A. Gray), Oklahoma.
Chrysopsis fastigiata Greene, California.
Chrysopsis imbricata A. Nelson, Colorado.
Chrysopsis resinolens A. Nelson, Colorado, Wyoming.
Chrysopsis villosa (Pursh) Nutt., Colorado.
Chrysopsis sp., Arizona.
Chrysothamnus Bigelovii (A. Gray) Greene (*Bigelovia Bigelovii* A. Gray), Colorado.
Chrysothamnus Bloomeri (A. Gray) Greene (*Aplopappus Bloomeri* A. Gray), California.
Chrysothamnus elegans Greene, Colorado.
Chrysothamnus frigidus Greene, Wyoming.
Chrysothamnus glaucus A. Nelson, Wyoming.
Chrysothamnus graveolens (Nutt.) Greene (*Bigelovia graveolens* A. Gray), Colorado.
Chrysothamnus lanceolatus Nutt. (*Bigelovia Douglasii lanceolata* A. Gray), Colorado.
Chrysothamnus linifolius Greene, Utah.
Chrysothamnus marianus Rydb., Utah.
Chrysothamnus nauseosus (Pursh) Britton (*Bigelovia graveolens albicaulis* A. Gray), Montana, Nevada.
Chrysothamnus plattensis Greene, Colorado, Montana.
Chrysothamnus puberulus (D. C. Eaton) Greene (*Bigelovia Douglasii puberula* A. Gray), Utah.
Chrysothamnus pulcherrimus A. Nelson, Utah.
Chrysothamnus pumilus Nutt. (*Bigelovia Douglasii pumila* A. Gray), Colorado, Utah.
Chrysothamnus viscidiflorus (Hook.) Nutt. (*Bigelovia Douglasii* A. Gray), Utah.
Erigeron arenarioides A. Gray (*Aster arenarioides* A. Gray), Utah.
Erigeron caespitosus Nutt., Wyoming.
Erigeron Eatonii A. Gray, Wyoming.
Erigeron filiformis (Hook.) Nutt., Nevada.
Erigeron macranthus Nutt., Colorado, Utah, Wyoming.
Erigeron microlonchus Greene, Wyoming.
Erigeron salsuginosus (Richards.) A. Gray, Utah.
Eucephalus glaucus Nutt. (*Aster glaucus* T. & G.), Colorado, Wyoming.
Grindelia aphanactis Rydb., Colorado, New Mexico.
Grindelia cuneifolia Nutt. (*G. robusta angustifolia* A. Gray), California.
Grindelia erecta A. Nelson, Colorado.
Grindelia fastigiata Greene, Colorado.
Grindelia inornata Greene, Colorado.

Grindelia perennis A. Nelson, Colorado.
Grindelia robusta Nutt., California.
Grindelia squarrosa (Pursh) Dunal, Colorado, Kansas, Montana, Nebraska, New Mexico, Texas, Wyoming; Saskatchewan.
Grindelia subalpina Greene, Colorado, New Mexico.
Grindelia texana Scheele, Colorado, Texas.
Grindelia sp., Durango.
Gutierrezia californica (DC.) T. & G., California; Lower California.
Gutierrezia diversifolia Greene, Arizona, Wyoming.
Gutierrezia filifolia Greene, Utah.
Gutierrezia glomerella Greene, New Mexico, Utah.
Gutierrezia juncea Greene, Arizona, New Mexico, Wyoming.
Gutierrezia longifolia Greene, Arizona.
Gutierrezia Sarothrae (Pursh) Britt. & Rusby (*G. Euthamiae* T. & G.), Colorado, Montana, Nevada, North Dakota, South Dakota, Utah, Wyoming.
Gutierrezia tenuis Greene, Arizona, New Mexico.
Gymnosperma corymbosum DC., Zacatecas.
Hazardia squarrosa (Hook. & Arn.) Greene (*Aplopappus squarrosus* Hook. & Arn.), California.
Hymenopappus carolinensis (Lam.) Porter, Oklahoma.
Isocoma heterophylla (A. Gray) Greene (*Linosyris heterophylla* A. Gray, *Bigelovia Wrightii* A. Gray), New Mexico.
Isocoma vernonioides Nutt. (*I. veneta* Greene, *Bigelovia veneta* A. Gray), Hidalgo.
Machaeranthera canescens (Pursh) A. Gray (*Aster canescens* A. Gray), Nevada.
Machaeranthera tanacetifolia (H.B.K.) Nees (*Aster tanacetifolius* H.B.K.), Colorado, Kansas.
Petradoria pumila (Nutt.) Greene (*Solidago pumila* T. & G., *Chrysoma pumila* Nutt.), Utah.
Prionopsis ciliata Nutt. (*Aplopappus ciliatus* DC.), Kansas.
Psilostrophe Cooperi (A. Gray) Greene (*Riddellia Cooperi* A. Gray), Arizona.
Psilostrophe tagetina (Nutt.) Greene (*Riddellia tagetina* T. & G.), Arizona.
Pyrrocoma Vaseyi (Parry) Rydb. (~*Aplopappus lanceolatus Vaseyi* Parry), Colorado.
Sideranthus annuus Rydb. (*Aplopappus rubiginosus* A. Gray), Colorado.
Sideranthus australis (Greene) Rydb. (*Eriocarpum australe* Greene), Arizona, Colorado.
Sideranthus gracilis (Nutt.) Rydb. (*Aplopappus gracilis* A. Gray), Arizona.
Sideranthus grindelioides (Nutt.) Rydb. (*Aplopappus Nuttallii* T. & G.), Montana, Wyoming.
Sideranthus spinulosus (Pursh) Sweet (*Aplopappus spinulosus* DC.), Colorado, Kansas, Montana, Nebraska, New Mexico, Texas; Aguascalientes.
Solidago californica Nutt., California.
Solidago mollis Bartl., South Dakota.
Solidago nana Nutt., Colorado.
Solidago nemoralis Ait., Illinois, Iowa, Minnesota, Nebraska.
Solidago oreophila Rydb., Colorado, Wyoming.
Solidago pulcherrima A. Nelson, Colorado, Utah, Wyoming.
Solidago rigidiuscula (T. & G.) Porter, Nebraska.
Solidago trinervata Greene, New Mexico, Utah.
Stenotus latifolius A. Nelson, Utah.
Tetradymia canescens DC., Nevada, Utah.
Tetradymia glabrata A. Gray, California, Nevada.
Tetradymia Nuttallii T. & G., Utah.
Tetradymia spinosa Hook. & Arn., Nevada, Wyoming.
Tetraneuris acaulis (Pursh) Greene (*Actinella acaulis* Nutt.), Montana, Utah, Wyoming.
Tetraneuris argentea (A. Gray) Greene (*Actinella argentea* A. Gray), New Mexico.
Tetraneuris arizonica Greene (*T. pilosa* Greene), Colorado.
Tetraneuris fastigiata Greene (*T. stenophylla* Rydb., *Actinella fastigiata* A. Nelson), Kansas.
Tetraneuris leptoclada (A. Gray) Greene (*Actinella leptoclada* A. Gray), Colorado, Utah.
Tetraneuris simplex A. Nelson (*Actinella simplex* A. Nelson), North Dakota.
Tetraneuris Torreyana (Nutt.) Greene (*Actinella Torreyana* Nutt.), Colorado, Wyoming.
Xylorrhiza glabriuscula Nutt. (*Aster glabriusculus* A. Gray), Wyoming.
Xylorrhiza Parryi (A. Gray) Greene (*Aster Parryi* A. Gray), Wyoming.

ON CICHORIACEAE:

Lygodesmia juncea (Pursh) D. Don, Colorado, Kansas, Nebraska, North Dakota, South Dakota; Manitoba.

TYPE LOCALITY: Colorado, on *Grindelia squarrosa*.

DISTRIBUTION: Manitoba to northern California southward to Texas, central Mexico, and Lower California.

ILLUSTRATIONS: Bot. Gaz. **28**: 420, *f. 3;* Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 3, f. 16;* Sydow, Monog. Ured. **1**: *pl. 1, f. 3, 7; pl. 3, f. 41, 42; pl. 5, f. 67, 68; pl. 8, f. 129; pl. 9, f. 130, 143.*

EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *16;* Barth. Fungi Columb. *2263, 2270, 2356, 2776, 3359, 3741, 3754, 3755, 3756, 4146, 4154, 4358;* Barth. N. Am. Ured. *144, 343, 351, 414, 445, 446, 552, 742, 841, 843, 867, 943, 969, 1046, 1077, 1243, 1671, 1829, 1845, 1875, 1972, 2028, 2059, 2271, 2438;* Brenckle, Fungi Dak. *491;* Carleton, Ured. Am. *25, 50;* Clements, Crypt. Form. Colo. *319, 320, 554, 559, 564, 569;* Ellis, N. Am. Fungi *1445;* Ellis & Ev. Fungi Columb. *179, 265, 754, 1375, 1666, 1975, 2072;* Ellis & Ev. N. Am. Fungi *2236, 2237, 2248, 3479;* Garrett, Fungi Utah. *18, 41, 43, 47, 89, 141, 143, 210, 213, 215;* D. Griff. W. Am. Fungi *61, 61a, 239, 240, 262, 364, 378, 378a, b;* Seym. & Earle, Econ. Fungi Suppl. *B11;* Sydow, Ured. *1020, 1707, 1770, 1820, 1913, 1920, 1941, 1942;* Vesterg. Mic. Rar. Sel. *1579.*

130. **Micropuccinia Marianae** (Sydow) Arthur & Jackson.

Puccinia Marianae Sydow, Hedwigia Beibl. **40**: 127. 1901.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous, gregarious and often confluent in orbicular groups 2–10 mm. across, small, round, 0.2–0.5 mm. in diameter, early naked, compact, pulvinate, blackish-brown, ruptured epidermis inconspicuous; teliospores variable, cylindric, fusiform, ellipsoid, or clavate, 18–28 by 40–64 μ, rounded or more commonly tapering and obtuse above, rounded or narrowed below; slightly or not constricted at septum; wall dark cinnamon- or chestnut-brown, thick, 2–3.5 μ, slightly thicker above, 4–8 μ, smooth; pedicel colorless, twice length of spore; mesospores frequently intermixed.

ON CARDUACEAE:
Sideranthus megacephalus (Nash) Small, Florida.
TYPE LOCALITY: Sanibel Island, Florida, on "*Chrysopsis Mariana*," now determined as *Sideranthus megacephalus*.
DISTRIBUTION: Southern Florida.

131. **Micropuccinia Notopterae** (Arth.) Arthur & Jackson.

Puccinia Notopterae Arth. Bull. Torrey Club **45**: 149. 1918.

O. Pycnia amphigenous, crowded on brownish areas 2–3 mm. across, conspicuous, dark-brown, globoid, 85–150 by 90–130 μ; ostiolar filaments up to 80 μ long.

III. Telia epiphyllous, becoming amphigenous, arranged in a concentric manner about the pyenia or on the veins becoming confluent, circular or oblong, 0.3–1 mm. across, early naked, pulverulent, dark cinnamon- to light chestnut-brown, ruptured epidermis noticeable; teliospores ellipsoid, 19–24 by 26–34 μ, rounded above and below, slightly constricted at septum; wall cinnamon-brown, about 1.5 μ thick, uniform, coarsely and rather sparingly verrucose; pedicel colorless, fragile.

ON CARDUACEAE:
Notoptera hirsuta (Sw.) Urban, Jamaica.
TYPE LOCALITY: Mandeville, Jamaica, on *Notoptera hirsuta*.
DISTRIBUTION: Known only from the type locality.

132. **Micropuccinia ferox** (Dietel & Holway) Arthur & Jackson.

Puccinia ferox Dietel & Holway; Holway, Bot. Gaz. **31**: 333. 1901.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous and caulicolous, closely crowded over large areas, causing considerable distortion, round, small, 0.2–0.5 mm. across, early naked, very pulverulent, cinnamon-brown, ruptured epidermis not conspicuous; teliospores ellipsoid, 22–26 by 35–48 μ, rounded above and below, noticeably constricted at septum; wall light cinnamon-brown, uniformly 1–2 μ thick, very finely and evenly verrucose-rugose, appearing smooth when wet; pedicel colorless, short, deciduous.

ON CARDUACEAE:
Verbesina diversifolia DC., Oaxaca.
Verbesina myriocephala Schultz-Bip., Costa Rica.
TYPE LOCALITY: Oaxaca, Mexico, on *Verbesina diversifolia*.
DISTRIBUTION: Southern Mexico to Costa Rica.
EXSICCATI: Barth. Fungi Columb. *4569*; Barth. N. Am. Ured. *141*.

133. **Micropuccinia absicca** (Jackson & Holway) Arthur & Jackson.

Puccinia absicca Jackson & Holway; Arthur, Mycologia **10**: 144. 1918.

O. Pycnia epiphyllous, few, gregarious in compact groups 0.5 mm. across, conspicuous, yellowish or light-orange, globoid or depressed-globoid, 30–50 μ broad by 30–40 μ high; ostiolar filaments short.

III. Telia epiphyllous or rarely hypophyllous, numerous in crowded orbicular groups surrounding the pycnia 1–3 mm. across, or more elongate to 10 mm. along the veins, small, roundish, 0.5–0.8 mm. across, somewhat tardily naked, pulverulent, chestnut-brown, ruptured

epidermis conspicuous; teliospores ellipsoid, 20–24 by 28–34 μ, rounded at both ends, slightly or not constricted at septum; wall cinnamon- to chestnut-brown, 2–2.5 μ thick, thickened to 5–7 μ at apex and over pore of lower cell by a hyaline umbo, moderately verrucose-rugose, often with tendency to form reticulations or to arrangement in longitudinal lines, the pore of lower cell near pedicel; pedicel short, colorless, usually deciduous, often attached laterally.

This species is correlated with *Bullaria proba* (Jackson & Holway) Arth. & Mains, being morphologically similar in telial characters, and with similar hosts. The agreement doubtless indicates a common origin for the two species.

ON CARDUACEAE:
Zexmenia frutescens villosa (Polak.) Blake, Costa Rica.
TYPE LOCALITY: San José, Costa Rica, on *Zexmenia frutescens villosa*.
DISTRIBUTION: Known only from the type locality.

134. **Micropuccinia Rudbeckiae** (Barth.) Arthur & Jackson.

Puccinia Rudbeckiae Barth. MS.

O. Pycnia not seen, probably not formed.

III. Telia amphigenous, closely gregarious and more or less confluent on discolored spots 0.3–1 cm. across, small, round or irregular, 0.2–0.5 mm. across, somewhat tardily naked, pulvinate, ruptured epidermis conspicuous; teliospores oblong or cylindric, 12–18 by 45–70 μ, rounded or obtuse above, the apex often bent to one side, somewhat narrowed or truncate below, not or slightly constricted at septum; wall light cinnamon-brown, thin, 1–1.5 μ, slightly thicker above, 3–4 μ, smooth; pedicel firm: colorless, one half length of spore or less.

ON CARDUACEAE:
Rudbeckia maxima Nutt., Texas.
TYPE LOCALITY: Longview, Texas, on *Rudbeckia maxima*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth, N. Am. Ured. ——.

135. **Micropuccinia ordinata** (Jackson & Holway) Arthur & Jackson.

Puccinia ordinata Jackson & Holway; Arth. Am. Jour. Bot. **5**: 530. 1918.

O. Pycnia not seen, probably not formed.

III. Telia amphigenous, chiefly hypophyllous, crowded and confluent opposite yellowish sunken spots which become brownish with age, round, 1–2.5 mm. across, early naked, pulvinate, blackish becoming cinereous from germination, ruptured epidermis noticeable; teliospores oblong cylindric, 16–19 by 45–70 μ, rounded or obtuse at apex, narrowed below, slightly constricted at septum; wall cinnamon-brown, 1–2 μ, darker and thickened above, 6–12 μ, smooth; pedicel short, deciduous, colored like the spore.

ON CARDUACEAE:
Calea insignis Blake, Guatemala.
Calea integrifolia (DC.) Hemsl., Guatemala.
TYPE LOCALITY: Quezaltenango, Guatemala, on *Calea insignis*.
DISTRIBUTION: Guatemala.

136. **Micropuccinia semota** (Jackson & Holway) Arthur & Jackson.

Puccinia semota Jackson & Holway; Arth. Am. Jour. Bot. **5**: 531. 1918.
Leptopuccinia semota Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, crowded in small groups 1–2 mm. across, round, 0.3–0.5 mm. in diameter, early naked, compact, pulvinate, dark chestnut-brown, ruptured epidermis inconspicuous; teliospores clavate, 13–18 by 48–58 μ, rounded at apex, slightly narrowed below, slightly constricted at septum; wall golden-brown, thin, 1 μ, thickened at apex to 10 μ, smooth; pedicel colorless, up to 16 μ long.

ON CARDUACEAE:
Gymnolomia subflexuosa Benth., Guatemala.
TYPE LOCALITY: Solola, Guatemala, on *Gymnolomia subflexuosa*.
DISTRIBUTION: Known only from the type locality.

137. **Micropuccinia Silphii** (Schw.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Silphii Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832.
Dicaeoma Silphii Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dasyspora Silphii Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Leptopuccinia Silphii Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous and caulicolous, solitary or gregarious and more or less confluent in orbicular groups 1–10 mm. across, on discolored spots, small, round, 0.5–1 mm. across, early naked, pulvinate, compact, at first cinnamon-brown becoming chocolate-brown, often cinereous by germination, ruptured epidermis usually inconspicuous; teliospores oblong, 10–16 by 30–48 μ, obtuse or acute at apex, often irregularly so, obtuse or truncate at base, slightly or not constricted at septum; wall cinnamon- or chestnut-brown, smooth, thin, 1–1.5 μ, thickened at apex, 4–10 μ; pedicel colorless or tinted, firm, once length of spore or shorter.

ON CARDUACEAE:
Silphium Asteriscus L., Alabama.
Silphium compositum Michx., Alabama.
Silphium integrifolium Michx., Illinois, Indiana, Kansas, Mississippi, Nebraska, Wisconsin.
Silphium laciniatum L., Alabama, Iowa, Kansas.
Silphium perfoliatum L., Indiana, Iowa, Mississippi, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin.
Silphium trifoliatum L., North Carolina, West Virginia.
TYPE LOCALITY: North Carolina, on *Silphium trifoliatum*.
DISTRIBUTION: West Virginia and northern Alabama westward to North Dakota and Kansas.
ILLUSTRATION: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 1, f. 4a, b, c.*
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *4a, b, c;* Barth. Fungi Columb. *2365, 3266, 3371, 4866 5071;* Barth. N. Am. Ured. *262, 866, 1471;* Brenckle, Fungi Dak. *262;* Carleton, Ured. Am. *41;* Ellis, N. Am. Fungi *1033, 1462;* Ellis & Ev. Fungi Columb. *1659;* Kellerm. & Swingle, Kans. Fungi *45;* Sydow, Ured. *482, 1278.*

138. **Micropuccinia Melampodii** (Dietel & Holway) Arthur & Jackson.

Puccinia solida Berk. & Curt. Jour. Linn. Soc. **10**: 356. 1869. Not *P. solida* Schw. 1832.
Puccinia Synedrellae Lagerh.; Sydow, Ured. *376*, hyponym. 1890.
Puccinia Melampodii Dietel & Holway; Holway, Bot. Gaz. **24**: 32. 1897.
Puccinia Synedrellae P. Henn. Hedwigia **37**: 277. 1898.
Dicaeoma cubense Kuntze, Rev. Gen. **3**[3]: 466. 1898.
Dicaeoma Synedrellae Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Puccinia Zinniae Sydow, Monog. Ured. **1**: 188. 1902.
Puccinia Diaziana Arth. Bot. Gaz. **40**: 203. 1905.
Puccinia Tridacis Arth. Bull. Torrey Club **33**: 516. 1906.
Dasyspora Synedrellae Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Puccinia Eleutherantherae Dietel, Ann. Myc. **7**: 354. 1909.
Puccinia Tetranthi Sydow, Ann. Myc. **17**: 33. 1919.
Micropuccinia Synedrellae Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.
Leptopuccinia Melampodii Sydow, Ann. Myc. **20**: 120. 1922.
Leptopuccinia Synedrellae Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous or occasionally amphigenous, gregarious, distinct or more commonly confluent, on discolored spots 0.2–1.5 cm. across, small, round, 0.2–0.5 mm. in diameter, usually early naked, chestnut-brown becoming cinereous by germination, compact, usually pulvinate, ruptured epidermis usually inconspicuous; teliospores oblong or clavate, 14–22 by 34–50 μ, rounded or obtuse above, obtuse or more commonly narrowed to pedicel below, slightly or not constricted at septum; wall golden- or cinnamon-brown, 1–2.5 μ thick, thickened above, 4–10 μ, smooth; pedicel firm, colorless or tinted like base of spore, equaling the spore or shorter.

ON CARDUACEAE:
Eleutheranthera ruderalis (Sw.) Schultz-Bip., Panama; Cuba; Grenada; Guadeloupe; Jamaica; Porto Rico; Santo Domingo.
Melampodium divaricatum (Rich.) DC., Morelos; Guatemala.
Parthenium Hysterophorus L., Texas.
Spilanthes oleracea Jacq., Martinique.
Synedrella nodiflora (L.) Gaertn. (*Verbesina nodiflora* L.), Panama; Barbados; Cuba; Jamaica; Porto Rico; Santo Domingo; Tortola.
Tetranthus hirsutus Spreng. (*T. littoralis* Sw.), Haïti.
Tridax procumbens L., Cuba.

Ximenesia encelioides (Benth. & Hook.) Cav. (*Verbesina encelioides* Benth. & Hook.), Coahuila.
Zinnia tenuiflora Jacq.,. Jalisco.
TYPE LOCALITY: Cuernavaca, Mexico, on *Melampodium* [*divaricatum*].
DISTRIBUTION: Central Texas to Panama and through the West Indies; also in South America.
ILLUSTRATIONS: Sydow, Mong. Ured. **1**: *pl. 7, f. 101; pl. 9, f. 139.*
EXSICCATI: Sydow, Ured. *376, 1534.*

139. **Micropuccinia Flaveriae** (H. S. Jackson) Arthur & Jackson.

Puccinia Flaveriae H. S. Jackson, Mycologia **14**: 117. 1922.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous or caulicolous, gregarious on discolored spots, or extending for considerable distances on stems, round, small, 0.2–0.5 mm. in diameter, tardily naked, chestnut-brown, pulvinate, the caulicolous sori long covered by the cinereous epidermis, ruptured epidermis of foliicolous sori conspicuous; teliospores irregularly ellipsoid, clavate, or cylindric, 15–19 by 32–50 μ, often bent to one side, rounded, obtuse or more or less acute above, rounded or narrowed below, not constricted at septum; wall light cinnamon-brown, 1.5–2 μ thick, much thicker above, 5–10 μ, smooth; pedicel one half length of spore or shorter, firm, concolorous with base of spore.

ON CARDUACEAE:
Flaveria campestris J. R. Johnston (*F. angustifolia* A. Gray), Kansas.
TYPE LOCALITY: Manhattan, Kansas, on *Flaveria angustifolia*.
DISTRIBUTION: Known only from the type locality.

140. **Micropuccinia Millefolii** (Fuckel) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Millefolii Fuckel, Jahrb. Nass. Ver. Nat. **23–24**: 55. 1870.
Puccinia conferta Dietel & Holway; Dietel, Erythea **1**: 250. 1893.
Puccinia recondita Dietel & Holway; Dietel, Erythea **2**: 128. 1894. Not *P. recondita* Roberge, 1857.
Puccinia artemisiicola Sydow, Monog. Ured. **1**: 14. 1902.
Dasyspora conferta Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dasyspora Millefolii Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.
Micropuccinia conferta Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.
Leptopuccinia artemisiicola Sydow, Ann. Myc. **20**: 120. 1922.
Leptopuccinia Millefolii Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown, probably not formed.

III. Telia amphigenous and caulicolous, usually hypophyllous on broad leaves, solitary or gregarious, often crowded in irregular groups on yellowish spots, round or oval, 0.2–0.8 mm. across, early naked, compact, pulvinate, dark cinnamon- or chestnut-brown becoming cinereous by germination, ruptured epidermis usually inconspicuous; teliospores oblong or clavate, 16–23 by 35–58 μ, rounded, truncate, or obtuse above, rounded or, more commonly narrowed below, slightly or not constricted at septum; wall light cinnamon-brown, 1.5–3 μ thick, darker and thickened above, 7–12 μ, smooth; pedicel firm, colorless, one half to once length of spore; mesospores occasionally intermixed.

This species is correlated with *Dicaeoma Dracunculi* (Thüm.) Arth. & Kern, the telial characters of the two species being very similar, and the hosts of the short-cycled species corresponding with the aecial hosts of the heteroecious species. This agreement doubtless indicates a common origin for the two species.

ON CARDUACEAE:
Achillea lanulosa Nutt., New Mexico.
Achillea Millefolium L., California, Montana, Oregon.
Artemisia albula Wooton, New Mexico.
Artemisia californica Less., California.
Artemisia frigida Willd., Colorado, Montana, North Dakota, South Dakota.
Artemisia gnaphalodes Nutt., Colorado, Montana.
Artemisia heterophylla Nutt., California.
Artemisia Hookeriana Besser, Utah.
Artemisia ludoviciana Nutt., Colorado, Oklahoma, Oregon.
Artemisia mexicana Willd., Texas.
Artemisia Suksdorfii Piper, Washington.
TYPE LOCALITY: Austria, on *Achillea Millefolium*.
DISTRIBUTION: North Dakota to northern Texas and westward to Washington and northern California; also in Europe.

ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 216;* Fl. Ital. Crypt. Ured. *f. 52a;* Grove, Brit. Rust Fungi *f. 82;* Sydow, Monog. Ured. 1: *pl. 1, f. 9, 11.*
EXSICCATI: Barth. Fungi Columb. *2444, 3169;* Barth. N. Am. Ured. *1036, 1145, 1233, 1434, 1837, 2629;* Brenckle, Fungi Dak. *318;* Clements, Crypt. Form. Colo. *555;* Garrett, Fungi Utah. *183;* D. Griff. W. Am. Fungi *354a.*

141. **Micropuccinia conglomerata** (Strauss) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1912.

Uredo conglomerata Strauss, Ann. Wett. Ges. **2**: 100. 1810.
Puccinia conglomerata Schmidt & Kunze, Deuts. Schwämme **8**: 4. *191.* 1818.
Puccinia Nardosmiae Ellis & Ev. Jour. Myc. **1**: 85. 1885.
Dicaeoma conglomeratum Kuntze, Rev. Gen. 3^3: 468. 1898.
Dicaeoma Nardosmiae Kuntze, Rev. Gen. 3^3: 469. 1898.
Dasyspora conglomerata Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Puccinia Petasites Vesterg. Micr. Rar. Sel. *1389.* 1909.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, rarely epiphyllous, gregarious but distinct in circular or irregular groups 0.5–1 cm. across, often arranged concentrically, small, round, 0.2–0.5 mm. in diameter, early naked, at first punctate, becoming pulverulent, chestnut-brown, ruptured epidermis noticeable; teliospores ellipsoid or oblong, 14–18 by 20–35 μ, obtuse or narrowed at either end, not constricted at septum; wall cinnamon-brown, thin, 1 μ, with small, hyaline, hemispheric umbo over pore at apex, 2–4 μ high, smooth; pedicel colorless, short, deciduous.

ON CARDUACEAE:
Petasites frigida (L.) Fries, Alberta, British Columbia.
Petasites palmata (Ait.) A. Gray, Michigan, Minnesota, New York; Ontario.
TYPE LOCALITY: Mountains of Bavaria, Germany, on *Tussilago alpina.*
DISTRIBUTION: Northern New York to the mountains of British Columbia; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 140;* Corda, Ic. Fung. **4**: *pl. 4, f. 47;* Hedwigia **30**: *pl. 36, f. 1;* Krypt.-fl. Brand. Pilze **3**: *f. B124.*
EXSICCATI: Barth. N. Am. Ured. *1564, 2627;* Sydow, Ured. *2424.*

142. **Micropuccinia expansa** (Link) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia expansa Link, in Willd. Sp. Pl. 6^2: 75. 1825.
Dicaeoma expansum Kuntze, Rev. Gen. 3^3: 468. 1898.
Dasyspora expansa Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous or occasionally epiphyllous, gregarious and more or less confluent in more or less circular groups 3–10 mm. across, on yellowish spots, small, round, 0.2–0.4 mm. in diameter, early naked, at first punctate becoming pulverulent, blackish-brown, ruptured epidermis noticeable; teliospores broadly ellipsoid, 18–26 by 30–38 μ, rounded or obtuse above, rounded below, not or very slightly constricted at septum; wall chestnut-brown, 1.5–2.5 μ thick, covered with a hemispheric hyaline papilla at apex and over pore of lower cell at septum, 3–4 μ high, smooth; pedicel colorless, short, deciduous.

ON CARDUACEAE:
Senecio aronicoides DC., California.
Senecio dispar A. Nelson, Utah.
TYPE LOCALITY: Austria, on *Cacalia alpina* [*Adenostyles alpina*].
DISTRIBUTION: Mountains of Utah and northeastern California; also in Europe.
ILLUSTRATIONS: Beitr. Krypt. Schweiz 2^2: *f. 141–144;* Hedwigia **30**: *pl. 26, f. 3.*
EXSICCATI: Garrett, Fungi Utah. 102.

143. **Micropuccinia Schistocarphae** (Jackson & Holway) Arthur & Jackson.

Puccinia Schistocarphae Jackson & Holway; Arth. Am. Jour. Bot. **5**: 534. 1918.
Leptopuccinia Schistocarphae Sydow, Ann. Myc. **20**: 121. 1922.

O. Pycnia unknown.

III. Telia hypophyllous, confluent over areas 0.5–2 mm. across, early naked, compact, pulverulent, very light yellowish-brown becoming cinereous by germination, ruptured epidermis inconspicuous; teliospores oblong or clavate, 16–22 by 39–55 μ, rounded at apex, slightly

narrowed below, slightly constricted at septum; wall colorless to very light golden-yellow, 1–1.5 μ thick, thickened to 5–9 μ at apex, smooth; pedicel colorless, less than length of spore.

ON CARDUACEAE:
Schistocarpha platyphylla Greenman, Guatemala.
TYPE LOCALITY: San Rafael, Dept. Guatemala, Guatemala, on *Schistocarpha platyphylla*.
DISTRIBUTION: Guatemala.

144. **Micropuccinia Emiliae** (P. Henn.) Arthur & Jackson.

Puccinia Emiliae P. Henn. Hedwigia **37**: 278. 1898.
Dasyspora Emiliae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, occasionally amphigenous, crowded and somewhat confluent in orbicular groups 1–5 mm. across, on discolored spots, small, round, 0.2–0.5 mm. in diameter early naked, compact, chestnut-brown, becoming cinereous by germination, ruptured epidermis usually noticeable; teliospores oblong-clavate, 14–20 by 35–55 μ, rounded or obtuse above, obtuse or narrowed below, slightly or not constricted at septum; wall cinnamon- or chestnut-brown, paler below, thin, 1–2 μ, thickened at apex, 4–10 μ, smooth; pedicel colorless, or more commonly tinted, half length of spore or shorter.

ON CARDUACEAE:
Calendula officinalis L. (cult.), Illinois, Indiana, Nebraska; Cuba.
Dimorphotheca cuneata (Thunb.) DC. (cult.), Indiana, Nebraska.
Emilia sagittata (Vahl) DC., Jamaica.
Emilia sonchifolia (L) DC., Florida; Antigua; Barbados; Cuba; Grenada; Jamaica; Martinique; Porto Rico.
Neurolaena lobata (L.) R. Br., Costa Rica; Panama; Cuba; Porto Rico.
TYPE LOCALITY: Jamaica, on *Emilia sagittata*.
DISTRIBUTION: Southern Florida southward through the West Indies, and in cultivation from Nebraska to Indiana.
ILLUSTRATION: Sydow, Monog. Ured. **1**: *pl. 4, f. 64.*
EXSICCATI: Barth. N. Am. Ured. *1863.*

145. **Micropuccinia recedens** (Sydow) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia recedens Sydow, Monog. Ured. **1**: 146. 1902.
Dasyspora recedens Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia unknown, probably not formed.

III. Telia hypophyllous, less commonly epiphyllous, densely gregarious and often more or less confluent in groups 4–8 mm. across, on discolored spots, small, round, 0.2–0.5 mm. in diameter, early naked, compact, pulvinate, cinnamon- or chestnut-brown, becoming cinereous by germination, ruptured epidermis at first noticeable; teliospores oblong or clavate, 14–22 by 32–48 μ, rounded or obtuse above, narrowed below, usually noticeably constricted at septum; wall light cinnamon-brown, 1.5–2.5 μ thick, broadly thickened above, 6–10 μ, smooth; pedicel delicate, colorless or slightly tinted, one half length of spore; mesospores occasionally intermixed.

This species is correlated with *Dicaeoma Eriophori* (Thüm.) Kuntze, the telial characters being essentially the same, and the hosts of the short-cycled form corresponding to aecial hosts of the heteroecious form. This agreement doubtless indicates a common origin for the two species.

ON CARDUACEAE:
Senecio aureus L., Delaware, Michigan, New Jersey, New York, Pennsylvania, West Virginia, Wisconsin.
Senecio Balsamitae Muhl., Alberta.
Senecio crocatus Rydb., Wyoming.
Senecio Harfordii Greenm., Oregon.
Senecio pseudaureus Rydb., Idaho, Montana.
TYPE LOCALITY: Ann Arbor, Michigan, on *Senecio* [*aureus*].
DISTRIBUTION: West Virginia and southern New York to the mountains of Oregon and Alberta.
ILLUSTRATIONS: Bull. Lab. Nat. Hist. Univ. Iowa **3**[2]: *pl. 2, f. 11c;* Sydow, Monog. Ured. **1**: *pl. 8, f. 124.*
EXSICCATI: Arth. & Holway, Ured. Exs. Ic. *11c;* Barth. N. Am. Ured. *1568 ,2632.*

146. **Micropuccinia Suksdorfii** (Ellis & Ev.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 41. 1921.

Puccinia Suksdorfii Ellis & Ev. Jour. Myc. **7**: 130. 1892.
Caeomurus Suksdorfii Kuntze, Rev. Gen. **3**[3]: 470. 1898.
Dasyspora Suksdorfii Arth. Résult. Sci. Congr. Bot. Vienne 347. 1906.

O. Pycnia amphigenous, widely scattered, conspicuous, chestnut-brown becoming white, flattened-globoid, 112–122 μ wide by 70–112 μ high; ostiolar filaments 80–144 μ long, slightly projecting beyond the ostiole.

III. Telia amphigenous, scattered over large areas, round or oblong, 0.2–2 mm. across, at first covered, soon becoming naked, pulverulent, chocolate-brown, ruptured epidermis conspicuous; teliospores ellipsoid or oblong-ellipsoid, 27–39 by 35–55 μ, rounded above and below, slightly constricted at septum; wall chestnut-brown, uniform in thickness, 2–3 μ, moderately conic-verrucose; pedicel colorless, fragile.

ON CICHORIACEAE:
Agoseris aurantiaca (Hook.) Greene (*Troximon aurantiacum* Hook.), Colorado.
Agoseris elata (Nutt.) Greene, Utah.
Agoseris glauca (Nutt.) Greene (*Troximon glaucum* Nutt.), Arizona, Idaho, Montana, Washington.
Agoseris grandiflora (Nutt.) Greene (*Troximon grandiflorum* A. Gray), Montana.
Agoseris leptocarpa Osterhout, Arizona.
Agoseris sp., Wyoming.
Nothocalais cuspidata (Pursh) Greene (*Troximon cuspidatum* Pursh), Montana.
TYPE LOCALITY: Washington, on *Troximon glaucum*.
DISTRIBUTION: Mountains of Colorado and Arizona northward to Montana and western Washington.
EXSICCATI: Barth. N. Am. Ured. *1969;* Garrett, Fungi Utah. *170*.

147. **Micropuccinia Fraseri** (Arth.) Arthur & Jackson.

Puccinia Fraseri Arth. Bull. Torrey Club **42**: 591. 1915.

O. Pycnia unknown.

III. Telia mostly hypophyllous, scattered, usually covering all the leaf, round, 0.2–0.5 mm. in diameter, early naked, strongly pulvinate, pale yellowish-brown, becoming whitish from germination, ruptured epidermis inconspicuous; teliospores oblong or ellipsoid, 13–20 by 30–42 μ, rounded at both ends, slightly or not constricted at septum; wall pale-yellow or colorless, rather thin, 1–1.5 μ, thickened at apex, 3–9 μ, smooth; pedicel colorless, 6–10 μ broad, about length of spore or less; urediniospores occasionally occurring among teliospores, ellipsoid or obovoid, 15–20 by 23–29 μ, the wall pale-yellow or colorless, 2–2.5 μ thick, moderately echinulate, the pores obscure, probably 3 or 4, equatorial.

ON CICHORIACEAE:
Hieracium albiflorum Hook., Montana.
Hieracium scabrum Michx., Nova Scotia, Quebec.
Hieracium venosum L., Pennsylvania.
TYPE LOCALITY: Pictou, Nova Scotia, on *Hieracium scabrum*.
DISTRIBUTION: Central Pennsylvania to eastern Canada, and in northern Montana.

148. **Micropuccinia columbiensis** (Ellis & Ev.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 40. 1921.

Puccinia columbiensis Ellis & Ev. Proc. Acad. Sci. Phila. **1893**: 153. 1893.
Dicaeoma columbiense Kuntze, Rev. Gen. **3**[3]: 468. 1898.
Puccinia bicolor Ellis & Ev. Bull. Torrey Club **27**: 572. 1900.
Dasyspora bicolor Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Puccinia Nabali Arth. Bull. Torrey Club **37**: 571. 1910.
Leptopuccinia columbiensis Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown.

III. Telia chiefly hypophyllous, crowded and circinating in groups 2–10 mm. in diameter, round or oblong, 0.3–1.5 mm. across, early naked, pulvinate, blackish-brown, ruptured epidermis conspicuous; teliospores clavate, oblong, or ellipsoid, 15–24 by 32–55 μ, rounded or truncate above, narrowed or rounded below, slightly constricted at septum; wall chestnut-brown above, lighter below becoming yellowish in lower cell, 1–2 μ thick, considerably thickened at apex, 7–15 μ, smooth; pedicel slightly tinted, about length of spore or shorter.

ON CICHORIACEAE:
Agoseris glauca (Nutt.) Greene (*Troximon glaucum* Nutt.), Washington, Wyoming; Alberta.
Hieracium cinereum Howell, Oregon.
Hieracium Scouleri Hook., Oregon, Washington.
Nabalus racemosus (Michx.) DC., Quebec.
TYPE LOCALITY: Banff, Canada, on "*Oenothera biennis*," error for *Troximon glaucum*.
DISTRIBUTION: Wyoming and Oregon northward into Canada, and one locality in eastern Quebec.
EXSICCATI: Barth. N. Am. Ured. *1433;* Ellis & Ev. Fungi Columb. *1570*.

149. **Micropuccinia maculosa** (Schw.) Arth. & Jackson; Arth. Bull. Torrey Club **48**: 42. 1921.

Puccinia maculosa Schw. Trans. Am. Phil. Soc. II. **4**: 295. 1832.
Leptopuccinia maculosa Sydow, Ann. Myc. **20**: 120. 1922.

O. Pycnia unknown.

III. Telia mostly hypophyllous, circinating in groups 2–8 mm. across, crowded, often confluent, round, 0.2–0.5 mm. in diameter, early naked, pulvinate, cinnamon-brown becoming cinereous from germination; teliospores oblong or clavate, 15–19 by 31–45 μ, rounded above, rounded or narrowed below, not or slightly constricted at septum; wall golden-brown, thin, 1–1.5 μ, thickened above, 4–12 μ, smooth; pedicel colorless or slightly tinted, up to 19 μ long.

This species is correlated with *Dicaeoma hieraciatum* (Schw.) Arth. & Kern, the telial characters of the two species being essentially the same, and the host of the short-cycled species being the same as one of the aecial hosts of the heteroecious species.

ON CICHORIACEAE:
Adopogon virginicus (L.) Kuntze (*Cynthia virginica* D. Don, *Krigia amplexicaulis* Nutt.), Illinois, Michigan, Missouri, Pennsylvania.
TYPE LOCALITY: Bethlehem, Pennsylvania, on "*Prenanthes* or *Hieracium*," error for *Adopogon virginicus*.
DISTRIBUTION: Local in the northern United States east of the Rocky Mountains.
EXSICCATI: Ellis & Ev. N. Am. Fungi *1855;* Rab.-Wint. Fungi Eur. *3413*.

DOUBTFUL SPECIES

PUCCINIA SEPULTA Berk. & Curt. Proc. Am. Acad. **4**: 126. 1860. "On leaves of *Ficus ?*" [Island of Omotepe] Nicaragua [March 18, 1856], *C. Wright.* The host bears a general resemblance but doubtless does not belong to the *Malvaceae;* the rust somewhat resembles *Micropuccinia heterospora* (Berk. & Curt.) Arth. & Jackson.

PUCCINIA SUFFULTA Berk. & Curt. Grevillea **3**: 55. 1874. "On leaves of some undetermined plant," Catoosa Springs, Georgia, *Ravenel.* The host of this collection has not yet been identified. The type specimen in the Kew herbarium shows the rust to be a species of *Micropuccinia* similar to *M. maculosa* (Schw.) Arth. & Jackson.

FORM–GENERA

Species whose life-cycle is not known, or is not readily assumed from related forms, and which can not be placed with confidence in the preceding genera, are here grouped under generic names that have long been in use, and have come to stand for certain definite characteristics. These genera do not represent the whole cycle of development, and are not based upon type species.

Telia present, sometimes accompanied by uredinia, but without pycnia or other spore-forms; teliospores free, pedicelled, with more or less of the pedicel remaining attached to the spore, smooth or verrucose.	
Teliospores one-celled.	1. UROMYCES.
Teliospores two-celled.	2. PUCCINIA.
Uredinia present, occasionally accompanied by pycnia or aecia, but without telia; urediniospores 1-celled, readily falling from the pedicel exposing the hilum, echinulate, or in a few species verrucose.	3. UREDG.
Aecia present, sometimes accompanied by pycnia, but without other spore-forms; aeciospores 1-celled, catenulate.	
Aecia having peridia.	
Peridia cupulate or less often cylindric, on angiospermous hosts.	4. AECIDIUM.
Peridia cylindric or bullate, on gymnospermous hosts.	5. PERIDERMIUM.
Aecia having no peridia.	6. CAEOMA.

1. UROMYCES.

Telia subepidermal, definite, erumpent or long covered by the epidermis, usually without paraphyses. Teliospores free, pedicellate, one-celled; wall usually colored, firm, smooth or verrucose, the pore one and apical, or nearly so.

Uredinia when present subepidermal, erumpent. Urediniospores echinulate, the pores more than one, and variously placed.

Genus based upon a concept, and not upon a type species.

Host belonging to family Caesalpiniaceae.	
Urediniospore-pores 3, equatorial.	1. *U. imperfectus.*
Urediniospore-pores 3–5, variable.	2. *U. guatemalensis.*
Host belonging to family Krameriaceae.	3. *U. Krameriae.*
Host belonging to family Fabaceae.	
Teliospores globoid.	4. *U. Sabineae.*
Teliospores obovoid.	5. *U. illotus.*
Host belonging to family Euphorbiaceae.	
Urediniospore-wall 1.5 μ thick, or less.	6. *U. oaxacanus.*
Urediniospore-wall 1.5 μ thick, or more.	7. *U. agnatus.*
Host belonging to family Acanthaceae.	8. *U. Hariotanus.*
Host belonging to family Carduaceae.	
Teliospores globoid.	9. *U. piauhyensis.*
Teliospores oblong.	10. *U. oblongisporus.*

1. **Uromyces imperfectus** Arth. Bull. Torrey Club 47: 472. 1920.

Uredo Bauhiniae Berk. & Curt. Proc. Am. Acad. 4: 126. 1860.
Uromyces Bauhiniae Vesterg. Ark. Bot. 4^{15}: 21. 1905. Not *U. Bauhiniae* P. Henn. 1895.

II. Uredinia hypophyllous, scattered, round, 0.2–0.3 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores broadly ellipsoid, 21–26 by 26–31 μ; wall dark cinnamon-brown, 1.5–2.5 μ thick, rather sparsely and strongly echinulate, the pores 3, equatorial.

III. Telia hypophyllous, scattered, round, 0.2–0.3 mm. in diameter, early naked, pulverulent, chocolate-brown, ruptured epidermis inconspicuous; teliospores broadly ellipsoid, 18–21 by 19–23 μ, rounded at both ends; wall dark chestnut-brown, 3 μ thick, slightly thickened at apex, 4–4.5 μ, reticulate with meshes 1–1.5 μ wide; pedicel colorless, fragile.

ON CAESALPINIACEAE:
Bauhinia sp., Nicaragua; Jamaica.
TYPE LOCALITY: Nicaragua, on *Bauhinia* sp.
DISTRIBUTION: Nicaragua and Jamaica.
ILLUSTRATION: Ark. Bot. 4^{15}: *pl. 1, f. 4.*

2. **Uromyces guatemalensis** Vesterg. Ark. Bot. 4^{15}: 20. 1905.

II. Uredinia hypophyllous, scattered, round, minute, 0.1–0.2 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores globoid or ellipsoid, 18–22 by 20–25 μ; wall cinnamon-brown, 1.5–2 μ thick, moderately and rather finely echinulate, the pores 4–5, sometimes 3, equatorial or somewhat scattered.

III. Telia amphigenous, scattered, round, minute, 0.1–0.2 mm. in diameter, early naked, pulverulent, dark chocolate-brown, ruptured epidermis inconspicuous; teliospores globoid or ellipsoid, 19–22 by 23–27 μ, rounded at both ends; wall chocolate-brown, rather thick, 2.5–3.5 μ, thickened at apex, 5–7 μ, reticulate with meshes about 2 μ across; pedicel fragile, colorless, about as long as spore.

ON CAESALPINIACEAE:
Bauhinia inermis Pers., Guatemala; Costa Rica.
TYPE LOCALITY: Retalhuleu, Guatemala, on *Bauhinia* sp.
DISTRIBUTION: Central America.
ILLUSTRATION: Ark. Bot. 4^{15}: *pl. 1, f. 3.*

3. **Uromyces Krameriae** Long; Arth. Bull. Torrey Club 45: 143. 1918.

III. Telia amphigenous and caulicolous, scattered, oblong, 0.1–2 mm. long, soon opening by a longitudinal slit, loosely and prominently pulvinate, chestnut-brown, ruptured epidermis

evident; teliospores broadly ellipsoid or globoid, 21–23 by 23–29 μ, rounded at both ends; wall cinnamon-brown, rather thick, 2.5–3 μ, thickened at apex into a broad paler umbo, 6–9 μ, smooth; pedicel colorless, once or twice length of spore.

ON KRAMERIACEAE:
Krameria parvifolia Benth., Texas.
TYPE LOCALITY: Denton, Texas, on *Krameria parvifolia*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *1992*.

4. **Uromyces Sabineae** Arth. Mycologia 9: 69. 1917.

II. Uredinia hypophyllous, scattered or somewhat gregarious on slightly reddish, effused spots, round, 0.1–0.2 mm. across, soon naked, light cinnamon-brown, pulverulent, ruptured epidermis evident; urediniospores globoid or broadly obovoid, 18–20 by 19–26 μ; wall light-yellow, thin, about 1.5 μ, moderately echinulate, the pores 3 or occasionally 4, equatorial, fairly distinct.

III. Telia hypophyllous, scattered or somewhat gregarious, pulvinate, round, 0.1–0.3 mm. across, early naked, blackish-brown, ruptured epidermis evident; teliospores globoid or broadly ellipsoid, 20–24 by 22–29 μ; wall dark chestnut-brown, moderately thick, 3 μ, thicker above, 4–7 μ, moderately verrucose; pedicel colorless, one half to once length of spore.

ON FABACEAE:
Sabinea punicea Urban, Porto Rico.
TYPE LOCALITY: Maricaò, Rio Grande river, Porto Rico, on *Sabinea punicea*.
DISTRIBUTION: Known only from the type locality.

5. **Uromyces illotus** Arth. & Holway; Arth. Am. Jour. Bot. **5**: 441. 1918.

II. Uredinia hypophyllous, scattered, round or oval, 0.2–0.5 mm. across, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis rather inconspicuous; urediniospores obovoid, 16–23 by 24–27 μ; wall cinnamon-brown, moderately thick, 1.5 μ, moderately echinulate, the pores 3 or 4, equatorial or sometimes scattered.

III. Telia hypophyllous, scattered, round, 0.1–0.3 mm. across, early naked, compact, dark chocolate-brown, ruptured epidermis rather inconspicuous; teliospores obovoid or ellipsoid, 19–21 by 24–31 μ, rounded at apex and base; wall dark chestnut-brown, thick, 2–2.5 μ, thickened at apex to 5 μ, closely and finely verrucose; pedicel colorless, once and a half times spore-length.

ON FABACEAE:
Mucuna Andreana M. Micheli, Guatemala.
TYPE LOCALITY: Chinaulta, Guatemala, on *Mucuna Andreana*.
DISTRIBUTION: Known only from the type locality.

6. **Uromyces oaxacanus** Dietel & Holway; Holway, Bot. Gaz. **31**: 327. 1901.

II. Uredinia hypophyllous, scattered, round, 0.1–0.3 mm. in diameter, rather early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores broadly ellipsoid or obovoid, 18–20 by 21–24 μ; wall golden- or cinnamon-brown, 1–1.5 μ thick, rather closely and finely echinulate, the pores 2, equatorial, rather indistinct.

III. Telia amphigenous, scattered, round, 0.1–0.3 mm. in diameter, early naked, pulverulent, chocolate-brown, ruptured epidermis evident; teliospores rather irregularly ellipsoid or globoid, 22–27 by 26–32 μ, rounded at both ends; wall chestnut-brown, rather thick, about 3 μ, thickened at apex, 4–5 μ, unevenly and coarsely verrucose especially at apex; pedicel colorless, 35–65 μ long.

ON EUPHORBIACEAE:
Bivonea urens (L.) Arth. (*Jatropha urens* L.), Oaxaca; Guatemala.
TYPE LOCALITY: Oaxaca, Mexico, on *Jatropha urens*.
DISTRIBUTION: Southern Mexico and Guatemala.

7. **Uromyces agnatus** Arth. Bull. Torrey Club **38**: 378. 1911.

II. Uredinia chiefly hypophyllous, scattered, often confluent, irregularly roundish, 0.2–0.5 mm. across, at first bullate, soon naked, pulverulent, light cinnamon-brown, ruptured epidermis conspicuous; urediniospores broadly ellipsoid, 18–23 by 21–29 μ; wall light golden-brown, rather thick, 1.5–2.5 μ, sparsely and rather inconspicuously echinulate, the pores 2, opposite and equatorial, usually distinct.

III. Telia chiefly hypophyllous, scattered, sometimes confluent, roundish, 0.1–0.4 mm. across, at first bullate, soon naked, pulverulent, dark chocolate-brown, ruptured epidermis conspicuous; teliospores ovoid or ellipsoid, 23–29 by 29–35 μ, narrowed or rounded above, rounded below; wall chestnut-brown, thick, 3–4 μ, slightly thicker above, 5–7 μ, coarsely and irregularly verrucose; pedicel colorless, slender, fragile, about length of spore.

ON EUPHORBIACEAE:
Bivonea stimulosa (Michx.) Raf. (*Cnidoscolus stimulosus* A. Gray, *Jatropha stimulosa* Michx.), Florida, South Carolina.
TYPE LOCALITY: Dunedin, Florida, on *Jatropha stimulosa*.
DISTRIBUTION: Southern South Carolina to southern Florida.

8. **Uromyces Hariotanus** Lagerh.; Arth. Mycologia **10**: 125. 1918.

III. Telia amphigenous, numerous, scattered or sometimes crowded, round or spreading, irregular, 0.2–1 mm. across, early naked, pulverulent, chocolate-brown, ruptured epidermis evident; teliospores ellipsoid, 19–21 by 26–32 μ, slightly narrowed or rounded at both ends; wall chestnut- or cinnamon-brown, thick, 3–4 μ, the apex thickened into a light-brown or colorless umbo, 6–9 μ, closely or moderately and noticeably verrucose; pedicel colorless, fragile, tapering toward the base, frequently roughened below, about one and one half times length of spore.

ON ACANTHACEAE:
Thyrsacanthus strictus Nees, Costa Rica.
TYPE LOCALITY: Guamampata, Prov. Chimborazo, Ecuador, on Acanthaceae [probably *Thyrsacanthus strictus*].
DISTRIBUTION: Costa Rica; also in South America.

9. **Uromyces piauhyensis** P. Henn. Hedwigia **47**: 266. 1908.

II. Uredinia hypophyllous, scattered, round, 0.2–0.3 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores triangular-obovoid or flattened-globoid, 19–23 by 16–20 μ; wall cinnamon-brown, 1.5 μ thick, closely and finely echinulate, the pores 2, equatorial.

III. Telia hypophyllous, scattered, round, 0.2–0.5 mm. in diameter, early naked, pulverulent, chocolate-brown, ruptured epidermis inconspicuous; teliospores globoid, 26–32 μ in diameter; wall dark chestnut-brown, thick, 3–5 μ, thickened at apex into a yellowish umbo, 7–10 μ, moderately and finely conic-verrucose; pedicel colorless, up to twice length of spore.

ON CARDUACEAE:
Wedelia reticulata DC., Porto Rico.
Wedelia rugosa Greenman, Cuba.
Wedelia rugosa tenuis Greenman, Cuba.
TYPE LOCALITY: Serra Nova, Piauhý, Brazil, on *Wedelia* sp.
DISTRIBUTION: West Indies; also in South America.

10. **Uromyces oblongisporus** Ellis & Ev. Bull. Torrey Club **25**: 507. 1898.

III. Telia amphigenous, scattered, round, 0.5–1 mm. in diameter, early naked, pulverulent, dark chocolate-brown, ruptured epidermis inconspicuous; teliospores oblong or ellipsoid, 18–21 by 28–35 μ, rounded above and below; wall dark chestnut-brown, 2–2.5 μ thick, thickened up to 5 μ at apex, sparsely and inconspicuously verrucose, appearing smooth below; pedicel colorless, fragile, about length of spore.

ON CARDUACEAE:
Artemisia tridentata Nutt., Wyoming.

TYPE LOCALITY: Sweetwater county, Wyoming, on *Artemisia tridentata*.
DISTRIBUTION: Known only from the type locality.

EXCLUDED SPECIES

UROMYCES PLURIANNULATUS Berk. & Curt. Grevillea **3**: 57. 1874. On *Sanicula*, from Alabama. Belongs to the *Chytridiaceae* (see Farlow, Bot. Gaz. **10**: 243. 1885, and Rhodora **10**: 12. 1908).

2. PUCCINIA.

Telia and uredinia as in *Uromyces*, except that the teliospores are two-celled, with one pore in each cell.

Genus based upon a concept, and not upon a type species.

Host belonging to family Alliaceae. 1. *P. pagana.*
Host belonging to family Dioscoreaceae. 2. *P. valida.*
Host belonging to family Musaceae. 3. *P. Heliconiae.*
Host belonging to family Orchidaceae. 4. *P. cinnamomea.*
Host belonging to family Chenopodiaceae. 5. *P. Dondiae.*
Host belonging to family Ranunculaceae.
  Teliospore-wall coarsely verrucose. 6. *P. Viornae.*
  Teliospore-wall smooth. 7. *P. stromatica.*
Host belonging to family Dilleniaceae. 8. *P. vergrandis.*
Host belonging to family Sapotaceae. 9. *P. Johnstonii.*
Host belonging to family Asclepiadaceae. 10. *P. Marsdeniae.*
Host belonging to family Heliotropiaceae. 11. *P. gilva.*
Host belonging to family Verbenaceae. 12. *P. senilis.*
Host belonging to family Scrophulariaceae.
  Urediniospore-pores 2, in occasional spores 3.
    Teliospores ellipsoid. 13. *P. Collinsiae.*
    Teliospores oblong. 14. *P. Antirrhini.*
  Urediniospore-pores 3. 15. *P. Castillejae.*
Host belonging to family Bignoniaceae. 16. *P. aequinoctialis.*
Host belonging to family Plantaginaceae. 17. *P. pacifica.*
Host belonging to family Rubiaceae. 18. *P. fallaciosa.*
Host belonging to family Carduaceae.
  Of the tribe Inuleae. 19. *P. Gnaphalii.*
  Of the tribe Heliantheae.
    Teliospore-wall smooth.
      Teliospore-wall evenly thick. 20. *P. punctoidea.*
      Teliospore-wall thicker above.
        Pedicel inflated. 21. *P. turgidipes.*
        Pedicel cylindric.
          Teliospores oblong, obovate, or clavate.
            Urediniospore-wall thin, 1-1.5 μ.
              Urediniospore-wall minutely echinulate. 22. *P. Tithoniae.*
              Urediniospore-wall strongly echinulate. 23. *P. Axiniphylli.*
            Urediniospore-wall thick, 2–3 μ.
              Urediniospore-wall minutely echinulate.
                Urediniospores 23–26 $\times$ 26–32 μ. 24. *P. nuda.*
                Urediniospores 16–23 $\times$ 24–26 μ. 25. *P. Parthenices.*
              Urediniospore-wall prominently echinulate. 26. *P. Guardiolae.*
          Teliospores usually ellipsoid.
            Teliospore-wall greatly thickened above, 10–12 μ. 27. *P. Noccae.*
            Teliospore-wall somewhat thickened above, 3–9 μ.
              Teliospore-wall thick, 3–5 μ.
                Teliospores 28–32 μ broad.
                  Urediniospore-wall strongly echinulate. 28. *P. Otopappi.*
                  Urediniospore-wall minutely echinulate. 29. *P. Parthenii.*
                Teliospores 23–26 μ broad. 30. *P. vaga.*
              Teliospore-wall thin, 1.5–2.5 μ. 31. *P. Melantherae.*
    Teliospore-wall roughened.
      Teliospore-wall evenly thick. 32. *P. globulifera.*
      Teliospore-wall thicker above.
        Teliospore-wall thin, 1.5–2.5 μ. 33. *P. Zaluzaniae.*
        Teliospore-wall thick, 3–6 μ.
          Teliospore-wall 3–4 μ thick, 5–7 μ above.
            Urediniospore-wall 1–1.5 μ, closely echinulate. 34. *P. nanomitra.*
            Urediniospore-wall 1.5–2.5 μ, sparsely echinulate. 35. *P. Electrae.*
          Teliospore-wall 4–6 μ thick, 7–10 μ above. 36. *P. Iostephanes.*
Of the tribe Helenieae.
  Teliospore-wall smooth.
    Urediniospore-wall finely verrucose. 37. *P. Porophylli.*
    Urediniospore-wall moderately echinulate. 38. *P. tageticola.*
  Teliospore-wall roughened.
    Teliospores large, 30–40 μ long. 39. *P. jaliscana.*
    Teliospores small, 26–30 μ long. 40. *P. Eriophylli.*

Of the tribe Senecioneae. 41. *P. arnicalis.*
Of the tribe Cynareae.
Teliospore-wall considerably thickened above. 42. *P. Trixitis.*
Teliospore-wall scarcely thickened above. 43. *P. Onopordi.*

1. **Puccinia pagana** Arth. Bull. Torrey Club **38**: 372. 1911.

Allodus pagana Orton, Mem. N. Y. Bot. Gard. **6**: 181. 1916.

III. Telia amphigenous, scattered, oval, 0.1–0.4 mm. broad, 0.2–0.7 mm. long, tardily naked, cinnamon-brown, somewhat pulverulent, ruptured epidermis conspicuous; teliospores broadly ellipsoid or fusiform, 18–23 by 27–35 μ, not constricted at septum; wall cinnamon-brown, 1.5–2 μ thick, often slightly thickened above, 3–4 μ, sometimes with a pale papilla, very finely and inconspicuously verrucose, more evidently so near the apex; pedicel colorless, fragile, half length of spore or less.

ON ALLIACEAE:
Allium reticulatum G. Don, Colorado.
TYPE LOCALITY: Dead Lake, Pikes Peak, Colorado, on *Allium reticulatum*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Clements, Crypt. Form. Colo. *141*.

2. **Puccinia valida** Arth. Bull. Torrey Club **42**: 591. 1915.

II. Uredinia hypophyllous, scattered unevenly, irregularly rounded or somewhat elongate, 0.3–0.7 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; urediniospores ellipsoid or broadly obovoid, 17–22 by 22–28 μ; wall cinnamon-brown, 1.5–2.5 μ thick, moderately or sparsely echinulate, the pores 2, slightly superequatorial.

III. Telia hypophyllous, scattered, round, 0.1–0.8 mm. in diameter, early naked, somewhat pulvinate, becoming pulverulent, dark cinnamon-brown becoming cinereous from germination, ruptured epidermis inconspicuous; teliospores oblong or obovoid-oblong, 13–19 by 28–39 μ, rounded above, slightly narrowed below, slightly constricted at septum; wall cinnamon-brown, thin, 1 μ, thickened at apex up to 4–7 μ, smooth; pedicel tinted, fragile, as long as spore.

ON DIOSCOREACEAE:
Dioscorea convolvulacea Schlecht. & Cham., Oaxaca.
TYPE LOCALITY: Jalapa, Mexico, on *Dioscorea convolvulacea*.
DISTRIBUTION: Known only from the type locality.

3. **Puccinia Heliconiae** (Dietel) Arth. Bull. Torrey Club **45**: 144. 1918.

Uredo Heliconiae Dietel, Hedwigia **36**: 35. 1897.

II. Uredinia hypophyllous, numerous, closely grouped or confluent, sometimes circinating on brown discolored spots, roundish, small, 0.2–0.5 mm. across, rather early naked, pulverulent, cinnamon-brown, ruptured epidermis noticeable; urediniospores broadly ellipsoid or obovoid, 18–24 by 23–32 μ; wall cinnamon-brown, rather thick, 1.5–3 μ, moderately and noticeably echinulate, the pores obscure, probably 2, equatorial.

III. Telia hypophyllous, scattered, soon naked, round, 0.3–0.5 mm. across, cinnamon-brown, ruptured epidermis evident; teliospores elongate-clavate, 15–19 by 60–72 μ, rounded above, not or slightly constricted at septum; wall pale cinnamon-brown, thin, 1 μ, much thickened above, 9–13 μ, smooth; pedicel short, colorless.

ON MUSACEAE:
Bihai borinquena Griggs, Porto Rico; Martinique.
Bihai latispatha (Benth.) Griggs (*Heliconia latispatha* Benth.), Panama.
TYPE LOCALITY: Rio de Janeiro, Brazil, on *Heliconia* sp.
DISTRIBUTION: Panama and the West Indies; also in South America.

4. **Puccinia cinnamomea** Dietel & Holway; Holway, Bot. Gaz. **24**: 29. 1897.

Dasyspora cinnamomea Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.

II. Uredinia not seen; urediniospores present in telia globoid, 20–29 by 24–32 μ; wall light cinnamon-brown, about 2 μ thick, moderately echinulate, the pores obscure, probably 6–8, scattered.

III. Telia hypophyllous, densely scattered on discolored areas, round, 0.3–0.7 mm. in diameter, early naked, pulvinate, cinnamon-brown or somewhat cinereous by germination, ruptured epidermis inconspicuous; teliospores oblong or cylindric, 15–18 by 29–35 μ, rounded above and below, somewhat constricted at septum; wall brownish- or golden-yellow, thin, 1 μ, thickened 2–4 μ at apex, smooth; pedicel colorless, one-half length of spore.

ON ORCHIDACEAE:
Genus and species indet., Morelos.
TYPE LOCALITY: Cuernavaca, Mexico, on "a terrestial orchid."
DISTRIBUTION: Known only from the type locality.

5. **Puccinia Dondiae** Arth. Bull. Torrey Club **42**: 592. 1915.

II. Uredinia amphigenous, scattered, round, 0.4–0.6 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis rather inconspicuous; urediniospores broadly ellipsoid, 26–29 by 32–39 μ; wall cinnamon-brown, 1.5 μ thick, closely and finely echinulate, the pores 8, scattered.

III. Telia amphigenous, scattered, round, 0.4–0.7 mm. across, early naked, pulverulent, blackish-brown, ruptured epidermis rather inconspicuous; teliospores ellipsoid, 32–39 by 42–51 μ, rounded at both ends, not constricted at septum; wall dark chocolate-brown, uniform in thickness, 4–5 μ, closely and coarsely verrucose; pedicel colorless, about as long as spore, more or less hygroscopic, swelling in water up to 32 μ wide.

ON CHENOPODIACEAE:
Dondia intermedia (S. Wats.) A. Heller (*Suaeda intermedia* S. Wats.), California.
TYPE LOCALITY: San Diego, California, on *Dondia intermedia*.
DISTRIBUTION: Known only from the type locality.

6. **Puccinia Viornae** Arth. Bull. Torrey Club **45**: 145. 1918.

II. Uredinia not seen; urediniospores in the telia, ellipsoid or elliptic-obovoid, 16–19 by 24–32 μ; wall pale golden-brown, thin, 1–1.5 μ, thicker above, 3–5 μ, closely echinulate, the pores indistinct, probably 2–4 and equatorial; paraphyses in the telia, intermixed with the spores or surrounding groups of spores, cylindric, clavate or capitate, 7–23 by 47–64 μ, the wall nearly colorless to golden-brown, darker above, thin, 1–1.5 μ, somewhat thickened above, 2–7 μ.

III. Telia caulicolous, scattered, oblong or linear, 1–3.5 mm. long, somewhat tardily naked, inclined to be pulverulent, chestnut-brown, ruptured epidermis conspicuous; paraphyses few, doubtless of uredinial origin, often wanting; teliospores ellipsoid or oblong, 16–21 by 29–35 μ, rounded at both ends, deeply constricted at septum; wall dark cinnamon-brown, uniformly 1.5–2 μ thick, moderately and coarsely echinulate-verrucose with conic warts; pedicel short, colorless, fragile.

The collection on which this species was founded also included pycnia and aecia, which were described as possibly being a part of the species. Later study makes it more probable, however, that they belong under *Dicaeoma Clematidis* (DC.) Arth. although the aeciospores are somewhat smaller than usual. The telia bear a close resemblance, as well as do the urediniospores and teliospores, to those of *Tranzschelia cohaesa*, which is only known on species of *Anemone*. Until the full life-cycle is definitely ascertained, however, the status of the species remains uncertain.

ON RANUNCULACEAE:
Viorna sp., Texas.
TYPE LOCALITY: Abilene, Texas, on *Viorna* sp.
DISTRIBUTION: Known only from the type locality.

7. **Puccinia stromatica** Berk. & Curt. Grevillea **3**: 53. 1874.

III. Telia caulicolous, crowded and confluent in groups up to 1.5 cm. long, round, small, early naked, somewhat pulverulent, the spores remaining together in a crust-like mass; rup-

tured epidermis inconspicuous; teliospores oblong or ellipsoid, 16–21 by 26–32 μ, rounded or obtuse above, rounded or somewhat narrowed below, slightly constricted at septum; wall golden- or chestnut-brown, rather thick, 1.5–2.5 μ, slightly thickened at apex up to 5 μ, smooth; pedicel slightly yellowish, up to twice length of spore.

ON RANUNCULACEAE:
Clematis sp., Alabama.
TYPE LOCALITY: North America [Alabama], on *Clematis* sp.
DISTRIBUTION: Known only from the type locality.

8. **Puccinia vergrandis** Arth. & Holway; Arth. Am. Jour. Bot. **5**: 474. 1918.

II. Uredinia not seen; urediniospores in the telia obovoid, 26–32 by 32–40 μ; wall golden-brown, thick, 3 μ below, thickening gradually up to 5 μ at apex, coarsely and moderately echinulate, the pores 2–4, approximately equatorial or slightly superequatorial.

III. Telia mostly hypophyllous, confluent in round or oblong groups 2–4 mm. across, round, 0.3–1 mm. in diameter, early naked, chestnut-brown becoming cinereous from germination, ruptured epidermis evident; teliospores ellipsoid or oblong, 29–31 by 37–45 μ, rounded above, blunt below, slightly constricted at septum; wall golden- or cinnamon-brown, rather thick, 1.5–2.5 μ, thicker above, 4–7 μ, rugosely verrucose; pedicel colorless, fragile.

ON DILLENIACEAE:
Saurauja pauciserrata Hemsl., Guatemala.
TYPE LOCALITY: Colomba, Quezaltenango, Guatemala, on *Saurauja pauciserrata*.
DISTRIBUTION: Known only from the type locality.

9. **Puccinia Johnstonii** Arth. Mem. Torrey Club **17**: 149. 1918.

II. Uredinia hypophyllous, scattered, roundish, small, 0.2–0.3 mm. across, tardily naked, at first opening by a pore, becoming pulverulent, cinnamon-brown, the overarching epidermis quite persistent; paraphyses peripheral in a single row, erect, arising from a short membranous base 2 or 3 cells deep, terete, 10–13 by 37–77 μ, the inner wall about 1 μ thick, the outer wall 3–7 μ, colorless, smooth; urediniospores ellipsoid or broadly obovate, 23–29 by 37–48 μ; wall cinnamon-brown, 1.5–2 μ thick, thicker above, 5–9 μ, with a lighter umbo, sparsely and strongly echinulate, the pores 4, sometimes 3, equatorial.

III. Teliospores in uredinial sori, ellipsoid or oblong, 23–30 by 33–40 μ, rounded at both ends, not constricted at septum; wall dark chestnut-brown, uniformly 3 μ thick, sparsely and coarsely echinulate, the points 1–2 μ long; pedicel colorless, rough, 10 by 16–23 μ, the upper part swelling in water up to 16 μ, often attached somewhat obliquely.

ON SAPOTACEAE:
Dipholis salicifolia (L.) A. DC., Cuba.
Sideroxylon foetidissimum L., Cuba.
TYPE LOCALITY: San Diego de las Baños, Pinar del Rio, Cuba, on *Dipholis salicifolia*.
DISTRIBUTION: Western Cuba.

10. **Puccinia Marsdeniae** Dietel & Holway; Holway, Bot. Gaz. **31**: 330. 1901.

II. Uredinia mostly hypophyllous, scattered, round, 0.2–0.6 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; urediniospores broadly ellipsoid or globoid, 26–29 by 29–34 μ; wall golden- or cinnamon-brown, thick, 2.5–3.5 μ, moderately or sparsely and very prominently echinulate, the pores about 6, scattered, rather indistinct.

III. Telia mostly epiphyllous, scattered, round, 0.2–0.6 mm. in diameter, early naked, pulverulent, dark chocolate-brown, ruptured epidermis evident; teliospores ellipsoid, 27–32 by 35–42 μ, rounded at both ends, not constricted at septum; wall dark chestnut-brown, uniformly very thick, 5–7 μ, moderately and prominently conic-verrucose; pedicel colorless, up to twice length of spore, often obliquely placed.

ON ASCLEPIADACEAE:
Marsdenia mexicana Decaisne, Morelos; Guatemala.
TYPE LOCALITY: Cuernavaca, Mexico, on *Marsdenia mexicana*.
DISTRIBUTION: Southern Mexico and Guatemala.
EXSICCATI: Barth. N. Am. Ured. *352*.

11. **Puccinia gilva** Arth. & Holway; Arth. Am. Jour. Bot. **5**: 479. 1918.

II. Uredinia hypophyllous, scattered, round or oval, 0.2–0.6 mm. across, early naked, pulverulent, whitish or brownish, ruptured epidermis noticeable; urediniospores obovoid, 16–19 by 19–23 μ; wall light-yellow or colorless, 1–2 μ thick, closely echinulate, the pores obscure.

III. Telia hypophyllous, scattered or crowded and circinating about the uredinia, round, 0.1–0.3 mm. across, early naked, pulvinate, pale-brown, oftentimes cinereous from germination, ruptured epidermis inconspicuous; teliospores oblong, obtuse above, sometimes slightly narrowed below, slightly constricted at septum; wall yellowish- or pale golden-brown, 1–1.5 μ thick, thickened at apex, 4–7 μ, smooth; pedicel colorless, fragile.

ON HELIOTROPIACEAE:
Heliotropium physocalycinum Donn. Smith, Guatemala.
TYPE LOCALITY: Antigua, Sacatepequez, Guatemala, on *Heliotropium physocalycinum*.
DISTRIBUTION: Mountains of Guatemala.

12. **Puccinia senilis** Arth. Bull. Torrey Club **47**: 470. 1920.

II. Uredinia hypophyllous, scattered, round, 0.2–0.4 mm. in diameter, early naked, pulverulent, yellow, ruptured epidermis inconspicuous; urediniospores obovoid or broadly ellipsoid, 15–18 by 19–23 μ; wall light-yellow, 1 μ thick, sparsely echinulate, the pores very inconspicuous, apparently 3 or 4, equatorial.

III. Telia amphigenous, scattered, round, 0.1–0.3 mm. in diameter, early naked, pulverulent, chocolate-brown, ruptured epidermis inconspicuous; teliospores ellipsoid, 18–24 by 27–40 μ, rounded at both ends, somewhat constricted at septum; wall dark chestnut-brown, 1.5–2.5 μ thick, 5–7 μ over the pores, often with a semi-hyaline cap over apex, coarsely and moderately verrucose; pedicel colorless, up to 50 μ long, tapering downward, roughened below, fragile.

ON VERBENACEAE:
Lippia myriocephala Cham. & Schlecht., Guatemala.
TYPE LOCALITY: Laguna on Lake Amatitlan, Guatemala, on *Lippia myriocephala*.
DISTRIBUTION: Known only from the type locality.

13. **Puccinia Collinsiae** P. Henn. Hedwigia **37**: 269. 1898.

II. Uredinia amphigenous, scattered, round or oval, 0.3–0.8 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis evident; urediniospores globoid or broadly ellipsoid, 16–23 by 21–26 μ; wall cinnamon-brown, 2–2.5 μ thick, finely and rather closely echinulate, the pores 2, sometimes 3, equatorial.

III. Telia amphigenous, scattered, round or oval, 0.3–0.8 mm. across, early naked, compact, dark chestnut-brown, ruptured epidermis evident; teliospores ellipsoid or clavate-ellipsoid, 19–23 by 31–42 μ, rounded above, rounded or somewhat narrowed below, slightly constricted at septum; wall chestnut-brown, 2–2.5 μ thick, thickened above, 7–10 μ, smooth; pedicel colorless, up to 50 μ long.

In the original description aecial characters are given substantially as follows: Aecia amphigenous, crowded upon reddish spots, cupulate, small; peridial cells yellowish-white, ellipsoid, tessellate; aeciospores globoid or broadly ellipsoid, 16–19 μ; wall yellowish, appearing smooth. The portion of the original collection in the Ellis Herbarium at the New York Botanical Garden shows no aecia. No other collections have been seen that agree with this material, and there is considerable doubt about the host belonging to the genus *Collinsia*.

ON SCROPHULARIACEAE:
Collinsia sp., California.
TYPE LOCALITY: Potter Valley, Mendocino County, California, on *Collinsia* sp.
DISTRIBUTION: Known only from the type locality.

14. **Puccinia Antirrhini** Dietel & Holway; Dietel, Hedwigia **36**: 298. 1897.

Puccinia Adenostegiae Arth. Bull. Torrey Club **29**: 231. 1902.
Dasyspora Adenostegiae Arth. Résult. Sci. Congr. Bot. Vienne 346. 1906.
Dicaeoma Antirrhini H. S. Jackson, Proc. Ind. Acad. Sci. **1915**: 443. 1916.
Puccinia Cordylanthi Blasdale, Univ. Calif. Publ. Bot. **7**: 134. 1918.

II. Uredinia mostly hypophyllous or caulicolous, numerous, scattered or in concentric circles on discolored spots, sometimes crowded into irregular patches, round or irregular, 0.2–1.5 mm. in diameter, rather early naked, somewhat pulvinate becoming pulverulent, light chestnut-brown, ruptured epidermis conspicuous; urediniospores globoid, obovoid, or broadly ellipsoid, 16–24 by 21–30 μ; wall cinnamon- or light chestnut-brown, 1.5–2.5 μ thick, finely and closely echinulate, the pores for the most part 2 and equatorial, sometimes 3 and placed irregularly.

III. Telia mostly caulicolous and hypophyllous, usually occurring on stems late in season, not particularly numerous, scattered, elliptic, 0.5–1.5 mm. long, tardily naked, pulvinate, becoming somewhat pulverulent, blackish-brown, ruptured epidermis conspicuous; teliospores usually oblong or clavate-oblong, 18–29 by 36–55 μ, sometimes broadly ellipsoid, smaller, 18–26 by 29–45 μ, rounded or acute above, rounded or narrowed below, moderately constricted at septum; wall chestnut-brown above, somewhat lighter below, 1.5–2.5 μ thick, thickened to 7–10 μ above, smooth; pedicel pale-yellow or colorless, up to three times length of spore.

ON SCROPHULARIACEAE:
Adenostegia filifolia (Nutt.) Abrams (*Cordylanthus filifolius* Nutt.), California.
Adenostegia pilosa (A. Gray) Greene (*Cordylanthus pilosus* A. Gray), California.
Antirrhinum majus L., California, Colorado, Connecticut, Florida, Illinois, Indiana, Iowa, Maine, Massachusetts, Michigan, Missouri, New Jersey, New York, Ohio, Oregon, Pennsylvania, South Dakota, Texas, Utah, Wisconsin; British Columbia, Manitoba, Ontario; Bermuda.
Antirrhinum Nuttallianum Benth., California.
Antirrhinum Virga A. Gray, California.
TYPE LOCALITY: Berkeley, Alameda County, California, on *Antirrhinum majus*.
DISTRIBUTION: Central to southern California on native plants, and throughout the United States, Canada, and Bermuda where *Antirrhinum majus* is cultivated in the open or under glass.
EXSICCATI: Barth. Fungi Columb. *2958;* Barth. N. Am. Ured. *21, 1634, 2224, 2532;* Sydow, Ured. *1364*.

15. **Puccinia Castillejae** (Dietel & Holway) Arth.; Blasdale, Univ. Calif. Publ. Bot. 7: 133. 1919.

Uredo Castillejae Dietel & Holway; Dietel, Erythea 1: 247. 1893.
Uredo Castillejae Tracy & Earle, Proc. Calif. Acad. Sci. 5: 731. 1895.
Uredo utahensis Sydow; Sacc. & Syd. in Sacc. Syll. Fung. 14: 396. 1899.

II. Uredinia amphigenous, scattered, round or oval, 0.5 mm. across, early naked, pulverulent, light cinnamon-brown, ruptured epidermis not evident; urediniospores broadly ellipsoid or globoid, 16–24 by 20–29 μ; wall golden-brown, thick, 2–3 μ, moderately or closely echinulate, the pores 3, equatorial.

III. Telia not seen; teliospores in uredinia broadly ellipsoid or ovoid, 18–23 by 23–29 μ, rounded above, slightly narrowed below, slightly or not constricted at septum; wall chestnut- or dark golden-brown, 2–3 μ thick, moderately thickened at apex, 5–7 μ, smooth; pedicel colorless, short, fragile.

ON SCROPHULARIACEAE:
Castilleja exilis A. Nelson (*C. affinis minor* A. Gray), Utah.
Castilleja foliolosa Hook. & Arn, California.
Castilleja stenantha A. Gray, California.
TYPE LOCALITY: Berkeley, California, on *Castilleja foliolosa*.
DISTRIBUTION: Southern Utah to central and southern California.

16. **Puccinia aequinoctialis** Holway, Ann. Myc. 3: 22. 1905.

II. Uredinia usually hypophyllous, scattered or crowded on irregular discolored areas 2–3 mm. across, round or oblong, 0.1–0.8 mm. across, early naked, pulverulent, pale cinnamon-brown, ruptured epidermis noticeable; urediniospores ellipsoid or obovoid, 15–19 by 18–26 μ; wall pale golden-brown, rather thin, 1–1.5 μ, moderately and strongly echinulate, the pores obscure.

III. Telia not seen; teliospores in the uredinia broadly ellipsoid, 21–26 by 33–39 μ, rounded above and below, strongly constricted at septum; wall cinnamon-brown, uniformly thin, 1–1.5 μ, smooth; pedicel colorless, short, fragile.

ON BIGNONIACEAE:
Cydista aequinoctialis (L.) Miers (*Bignonia aequinoctialis* L.), Cuba; Porto Rico.
TYPE LOCALITY: Baracoa, Cuba, on *Bignonia aequinoctialis*.

DISTRIBUTION: Greater Antilles; also in South America.
EXSICCATI: Barth. N. Am. Ured. *525*.

17. **Puccinia pacifica** Blasdale; Arth. Bull. Torrey Club **48**: 31. 1921.

II. Uredinia amphigenous, more abundant beneath, thickly scattered, irregularly rounded, 0.3–1 mm. across, at first bullate, soon naked, somewhat pulverulent, dark chestnut-brown, ruptured epidermis very inconspicuous; urediniospores ellipsoid or obovate, 22–26 by 26–32 μ; wall chestnut-brown, 2–3 μ thick, finely echinulate, the pores 2, equatorial.

III. Telia similar to the uredinia but somewhat darker and less pulverulent; teliospores oblong or obovate-oblong, 20–24 by 38–48 μ, rounded or obtuse above, obtuse or narrowed below, somewhat constricted at septum; wall chestnut-brown, lighter below, 1–1.5 μ thick, thicker above, 3–7 μ, smooth; pedicel colorless, fragile, once or twice length of spore when unbroken, 7–9 μ in diameter.

ON PLANTAGINACEAE:
Plantago maritima L., California.
TYPE LOCALITY: Montara Point, San Mateo County, California.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *2667*.

18. **Puccinia fallaciosa** Arth. Mycologia **9**: 84. 1917.

Uredo fallaciosa Arth. Mycologia **7**: 323. 1915.

II. Uredinia hypophyllous, irregularly gregarious on somewhat discolored spots, roundish, 0.1–0.5 mm. across, tardily naked, pulverulent, fuscous; urediniospores ellipsoid or obovoid, 18–23 by 24–29 μ; wall pale-yellow or slightly fuscous, 1–1.5 μ thick, moderately echinulate, the pores obscure.

III. Telia hypophyllous, few, scattered, punctate, small, early naked, pulvinate, surrounding tissues much browned, ruptured epidermis inconspicuous; teliospores ellipsoid, 13–16 by 26–31 μ, rounded or narrowed slightly above and below, moderately constricted at septum, germinating at maturity; wall colorless or very pale-yellow, 1–1.5 μ thick, uniform, smooth; pedicel colorless, short.

ON RUBIACEAE:
Palicourea crocea (Sw.) R. & S., Porto Rico.
Palicourea riparia Benth., Porto Rico.
Psychotria patens Sw., Porto Rico.
TYPE LOCALITY: Maricao, Porto Rico, on *Psychotria patens*.
DISTRIBUTION: Porto Rico.

19. **Puccinia Gnaphalii** (Speg.) P. Henn. Hedwigia Beibl. **41**: 66. 1902.

Uredo Gnaphalii Speg. Anal. Soc. Ci. Argent. **12**: 73. 1881.
Puccinia gnaphaliicola P. Henn. Hedwigia Beibl. **38**: 68. 1899.
Puccinia Gnaphalii Speg. Anal. Mus. Nac. Buenos Aires **19**: 309. 1909.

II. Uredinia mostly hypophyllous, numerous, scattered or gregarious, occasionally concentrically arranged, roundish, 0.2–0.7 mm. across, early naked, pulverulent, pale cinnamon-brown, ruptured epidermis at first conspicuous; urediniospores globoid or broadly ellipsoid, 18–23 by 23–26 μ; wall cinnamon-brown, 1.5–2.5 μ thick, finely and closely echinulate, the pores 2, rarely 3, equatorial or slightly superequatorial.

III. Telia hypophyllous, in arrangement, size, etc., conforming to the uredinia, compact, chestnut-brown; teliospores oblong, oblong-ovate, or oblong-clavate, 18–24 by 32–56 μ, rounded or rarely somewhat acute above, narrowed below, slightly constricted at septum; wall light-brown, thickened to 8 μ at apex, smooth; pedicel colorless below, tinted above, about as long as spore; mesospores occasionally intermixed with the teliospores.

ON CARDUACEAE:
Gnaphalium purpureum L., Louisiana, South Carolina.
Gnaphalium rhodanthum Schultz-Bip., Guatemala.
Gnaphalium spathulatum Lam., Alabama, North Carolina.
TYPE LOCALITY: Chacarita, Argentina, on *Gnaphalium americanum*.
DISTRIBUTION: North Carolina to Louisiana, and in Guatemala; also in South America.

20. **Puccinia punctoidea** Sydow, Monog. Ured. **1**: 182. 1902.

II. Uredinia not seen; urediniospores globoid, 24–29 μ in diameter; wall golden-yellow, rather thin, 1–1.5 μ, sparsely and moderately echinulate, the pores 2 or possibly 3, equatorial.

III. Telia epiphyllous or amphigenous, scattered, early naked, pulvinate, small, 0.3–0.7 mm. across, chocolate-brown, somewhat pulverulent, ruptured epidermis inconspicuous; teliospores ellipsoid or obovate-ellipsoid, 20–25 by 32–42μ, rounded at both ends or somewhat narrowed below, slightly constricted at septum; wall smooth, chestnut-brown, uniformly thick, 3–3.5 μ, the pore of each cell noticeable, depressed halfway, often with internal callous; pedicel colorless, delicate, once length of spore or less, largely deciduous.

ON CARDUACEAE:
Viguiera Pringlei Rob. & Greenm., Jalisco.
TYPE LOCALITY: Hills near Zapotlan, Mexico, on *Viguiera Pringlei*.
DISTRIBUTION: Known only from the type locality.

21. **Puccinia turgidipes** H. S. Jackson, Mycologia **14**: 110. 1922.

II. Uredinia not seen; urediniospores in the telia, strongly compressed laterally, when viewed with pores in optical section, oblong, 16–18 by 26–29 μ, when in face view, globoid, 24–27 by 26–29 μ; wall dark cinnamon-brown, 2.5–3 μ thick, moderately and prominently echinulate, the pores 2, opposite and equatorial.

III. Telia amphigenous, scattered, round, small, 0.2–0.5 mm. in diameter, early naked, becoming pulverulent, blackish-brown, ruptured epidermis not noticeable; teliospores globoid or broadly ellipsoid, 30–32 by 32–38 μ, rounded at both ends, not constricted at septum; wall chestnut-brown, 3–4 μ thick, thickened at apex to 6 μ, as well as over pore of lower cell near septum, smooth; pedicel colorless, once to twice length of spore, with thick walls above, becoming abruptly inflated 12–24 μ from point of attachment.

ON CARDUACEAE:
Viguiera deltoidea Parishii (Greene) Vasey & Rose, Arizona.
TYPE LOCALITY: Baboquivari Mountains, Arizona, on *Viguiera deltoidea Parishii*.
DISTRIBUTION: Known only from the type locality.

22. **Puccinia Tithoniae** Dietel & Holway; Holway, Bot. Gaz. **24**: 31. 1897.

II. Uredinia hypophyllous, scattered, round, small, 0.2–0.5 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis usually not conspicuous; urediniospores globoid or angularly obovoid, 19–23 by 20–26 μ; wall light cinnamon-brown, thin, 1 μ, very minutely and closely echinulate, the pores 2, slightly subequatorial.

III. Telia hypophyllous, scattered, round, small, 0.2–0.5 mm. across, usually early naked, pulvinate, chocolate-brown, ruptured epidermis usually inconspicuous; teliospores oblong or oblong-obovate, 22–26 by 34–48 μ, rounded at both ends, slightly constricted at septum; wall chestnut-brown, moderately thick, 1.5–2.5 μ, thickened above, 6–10 μ, usually with ill-defined semi-hyaline umbo, smooth; pedicel colorless, rather firm, as long as spore.

ON CARDUACEAE:
Tithonia diversifolia (Hemsl.) A. Gray, Guatemala.
Tithonia rotundifolia (Mill.) Blake (*T. speciosa* Hook., *T. tagetiflora* Desf.), Jalisco, Morelos; Costa Rica; Guatemala.
Tithonia scaberrima Benth., Guatemala.
Tithonia tubaeformis (Jacq.) Cass., Guanajuato, Hidalgo, Mexico (state); Guatemala.
TYPE LOCALITY: City of Mexico, Mexico, on *Tithonia "cubiflora,"* error for *T. tubaeformis*.
DISTRIBUTION: Southern Mexico and Central America.
EXSICCATI: Barth. Fungi Columb. *4674;* Barth. N. Am. Ured. *1274*.

23. **Puccinia Axiniphylli** Arth. Bot. Gaz. **40**: 201. 1905.

II. Uredinia not seen; urediniospores in the telia ellipsoid or globoid, 16–24 by 21–26 μ; wall yellowish, thin, 1–1.5 μ, moderately and strongly echinulate, the pores indistinct, probably 2 and equatorial.

III. Telia hypophyllous, irregularly gregarious or scattered, somewhat confluent, small, tardily and imperfectly naked, becoming somewhat pulverulent, dull chestnut-brown, ruptured

epidermis conspicuous; teliospores obovate, oblong, or clavate, irregular, large, 22–30 by 42–60 μ, obtuse or obliquely truncate above, rounded or somewhat narrowed below, slightly or not constricted at septum; wall smooth, dark cinnamon-brown, lighter below, rather thin, 1–2.5 μ, much thickened above, 7–12 μ; pedicel tinted, firm, 7–12 μ broad, equaling spore in length or usually shorter.

ON CARDUACEAE:
Axiniphyllum tomentosum Benth., Oaxaca.
TYPE LOCALITY: Oaxaca, Mexico, on *Axiniphyllum tomentosum.*
DISTRIBUTION: Southern Mexico, in vicinity of the type locality.
EXSICCATI: Barth. N. Am. Ured. *1529.*

24. **Puccinia nuda** Ellis & Ev. Jour. Myc. **3**: 57. 1887.

Puccinia Hemizoniae Ellis & Tracy, Jour. Myc. **7**: 43. 1891.
Puccinia Lagophyllae Dietel & Holway; Dietel, Erythea **1**: 250. 1893.
Dicaeoma Hemizoniae Kuntze, Rev. Gen. **3**^{3}: 469. 1898.
Dicaeoma nudum Kuntze, Rev. Gen. **3**^{3}: 469. 1898.
Puccinia Madiae Sydow, Monog. Ured. **1**: 121. 1902.

II. Uredinia amphigenous, scattered, round or oval, 0.5–1 mm. across, early naked, pulverulent, cinnamon-brown, ruptured epidermis slightly noticeable; urediniospores globoid or ellipsoid, 22–26 by 26–32 μ; wall dark or light cinnamon-brown, thick, 2.5–3 μ, very finely and closely echinulate, often appearing smooth when wet, the pores 2, opposite and equatorial.

III. Telia amphigenous, scattered, round, 1 mm. or less in diameter, early naked, pulvinate, compact, blackish-brown, ruptured epidermis noticeable; teliospores obovate-oblong or oblong, 20–26 by 32–48 μ, obtuse or rounded above, rounded or somewhat narrowed below, usually slightly constricted at septum; wall chestnut-brown, usually paler below and slightly so at apex, moderately thick, 2–2.5 μ, much thickened above, 6–10 μ, smooth; pedicel colorless, about length of spore.

ON CARDUACEAE:
Calycadenia truncata DC. (*Hemizonia truncata* A. Gray), Oregon.
Hemizonia citrina Greene, California.
Hemizonia Clevelandii Greene, California.
Hemizonia luzulaefolia DC., California.
Lagophylla congesta Greene, California.
Lagophylla ramosissima Nutt., Oregon, Washington.
Madaria elegans (D. Don) DC. (*Madia elegans* D. Don), Oregon.
Madia sativa Molina, Washington.
TYPE LOCALITY: Falcon Valley, Washington, on "*Arnica foliosa,*" error for *Madia*(?) sp.
DISTRIBUTION: Washington to central California; also in South America.
EXSICCATI: Barth. N. Am. Ured. *147, 453, 848, 1060;* Ellis & Ev. Fungi Columb. *549, 1762;* Ellis & Ev. N. Am. Fungi *3142;* Sydow, Ured. *1718.*

25. **Puccinia Parthenices** H. S. Jackson, Mycologia **14**: 108. 1922.

II. Uredinia not seen; urediniospores in the telia obovate or ellipsoid, 16–23 by 24–26 μ, slightly flattened laterally; wall light cinnamon-brown, 1.5–2.5 μ thick, very finely and closely echinulate, appearing smooth when wet, the pores 2, equatorial.

III. Telia hypophyllous, rarely epiphyllous, round, 0.4–0.8 mm. across, early naked, compact, pulvinate, blackish-brown, ruptured epidermis not conspicuous; teliospores obovate, oblong, or ellipsoid, 20–26 by 32–45 μ, rounded or obtuse above, rounded below, slightly constricted at septum; wall light chestnut-brown, 1.5–2.5 μ thick, thickened 7–9 μ at apex by a broad semi-hyaline umbo, similarly thickened over pore of lower cell at septum, smooth; pedicel colorless, firm, once to thrice length of spore.

ON CARDUACEAE:
Parthenice mollis A. Gray, Arizona.
TYPE LOCALITY: Fort Lowell, Arizona, on *Parthenice mollis.*
DISTRIBUTION: Southern Arizona.

26. **Puccinia Guardiolae** Dietel & Holway; Holway, Bot. Gaz. **31**: 334. 1901.

II. Uredinia hypophyllous, scattered or gregarious, round, small, 0.2–0.5 mm. in diameter,

somewhat tardily naked, pulverulent, chestnut-brown, ruptured epidermis conspicuous; urediniospores obovate or globoid, flattened laterally, when viewed with pores in face view 20–26 by 23–28 μ, when in side view 16–20 by 23–28 μ; wall dark cinnamon-brown, 2–2.5 μ thick, moderately and prominently echinulate, the pores 2, equatorial.

III. Telia not seen; teliospores occasional in the uredinia, oblong, clavate, or obovoid, 20–24 by 38–48 μ, rounded above, rounded or somewhat narrowed below, noticeably constricted at septum; wall light cinnamon-brown, thin, 1.5–2 μ, lighter above and thicker, 3–5 μ, smooth; pedicel colorless, equaling spore or shorter.

ON CARDUACEAE:
Guardiola mexicana Humb. & Bonpl., Morelos.
TYPE LOCALITY: Cuernavaca, Mexico, on *Guardiola mexicana*.
DISTRIBUTION: Known only from the type locality.

27. **Puccinia Noccae** Arth. Bot. Gaz. **40**: 202. 1905.

Puccinia Lagascaeae Speg. Anal. Mus. Nac. Buenos Aires **19**: 307. 1909.

II. Uredinia amphigenous, scattered, round, small, 0.25 mm. across, soon naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores globoid or broadly obovoid in face view, 24–26 by 23–26 μ, flattened laterally and cuneate in side view, 19–24 by 23–26 μ; wall cinnamon-brown, 1.5–2 μ thick, closely and evenly echinulate, the pores 2, near hilum.

III. Telia amphigenous, scattered, round, small, 0.25 mm. across, soon naked, becoming pulverulent, blackish, ruptured epidermis inconspicuous; teliospores broadly oblong or ellipsoid, 26–31 by 32–42 μ, rounded at both ends, or somewhat obtuse above, not constricted at septum in the thicker walled spores, prominently so in the thinner ones; wall dark chestnut-brown, 2–4 μ thick, thickened to 10–12 μ by a low semi-hyaline umbo over pore of upper cell and often similarly over pore of lower cell, smooth; pedicel colorless, firm, once to once and a half length of spore.

ON CARDUACEAE:
Nocca decipiens (Hemsl.) Kuntze (*Lagasca decipiens* Hemsl.), Jalisco.
Nocca rigida Cav. (*Lagasca suaveolens* H.B.K.), Guatemala; Oaxaca, Morelos.
TYPE LOCALITY: Sayula, Jalisco, Mexico, on *Nocca decipiens*.
DISTRIBUTION: Southern Mexico to Guatemala; also in South America.

28. **Puccinia Otopappi** Sydow, Monog. Ured. **1**: 129. 1902.

II. Uredinia not seen; urediniospores in the telia, globoid or ellipsoid, 21–27 by 24–30 μ; wall cinnamon-brown, 2.5–3 μ thick, strongly and sparsely echinulate, the pores 2, equatorial.

III. Telia chiefly epiphyllous, scattered, small, round, 0.2–0.5 mm. across, blackish, somewhat tardily naked, becoming pulverulent, ruptured epidermis noticeable; teliospores ellipsoid, 28–32 by 38–48 μ, rounded at both ends, not constricted at septum; wall chestnut-brown, thick, 3–5 μ, thickened to 6–7 μ above by a lighter colored layer and over pore of lower cell, which is usually placed midway between pedicel and septum, smooth; pedicel colorless, fragile, equaling spore or shorter.

ON CARDUACEAE:
Otopappus alternifolius B. L. Robinson, San Luis Potosí.
TYPE LOCALITY: San José Pass, Mexico, on *Otopappus alternifolius*.
DISTRIBUTION: Known only from the type locality.

29. **Puccinia Parthenii** (Speg.) Arth. Bull. Torrey Club **37**: 570. 1910.

Uredo Parthenii Speg. Anal. Mus. Nac. Buenos Aires **6** : 239. 1899.

II. Uredinia amphigenous, scattered or gregarious, round or oval, 0.3–0.5 mm. across, somewhat tardily naked, pulverulent, dark cinnamon-brown, ruptured epidermis conspicuous; urediniospores globoid or ellipsoid, 20–24 by 23–32 μ, often distorted and irregular, some spores much enlarged; wall cinnamon-brown, 2–3.5 μ thick, moderately and very finely echinulate, appearing almost smooth when wet, the pores 2 or 3, equatorial or irregularly disposed.

III. Telia not seen; teliospores occasional in the uredinia, semi-opaque, ellipsoid, 28–32 by 38–48 μ, rounded or obtuse above, rounded below, not constricted at septum; wall chocolate-brown, 4–5 μ thick, thicker above, 6–9 μ, by a broad sub-hyaline umbo, similarly thickened

over pore of lower cell at septum, smooth; pedicel colorless, fragile, once length of spore.

ON CARDUACEAE:
Parthenium argentatum A. Gray, Zacatecas.
Parthenium Hysterophorus L., Mexico (state); Bermuda.
Parthenium incanum H.B.K., Texas.
TYPE LOCALITY: Tecumán, Córdova, Argentina, on *Parthenium Hysterophorus*.
DISTRIBUTION: Southern Texas to southern Mexico; Bermuda; also in South America.

30. **Puccinia vaga** H. S. Jackson, Mycologia **14**: 112. 1922.

II. Uredinia hypop hyllous, becoming somewhat amphigenous, scattered, round, small 0.2–0.4 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis conspicuous; urediniospores globoid or broadly obovoid, 21–24 by 23–26 μ; wall light cinnamon-brown, thin, 1–1.5 μ, moderately and prominently echinulate, the pores 2, opposite and equatorial.

III. Telia amphigenous, scattered, round, small, 0.2–0.5 mm. in diameter, early naked, pulvinate, becoming somewhat pulverulent, blackish-brown, ruptured epidermis evident; teliospores broadly or narrowly ellipsoid, 23–26 by 27–48 μ, rounded at both ends, slightly constricted at septum; wall reddish chocolate-brown, concolorous, medium-thick, 3–4 μ, slightly thicker above, 4–6 μ; pedicel colorless, about twice length of spore.

ON CARDUACEAE:
Verbesina sp., Morelos.
TYPE LOCALITY: Cuernavaca, Mexico, on *Verbesina* sp.
DISTRIBUTION: Known only from the type locality.

31. **Puccinia Melantherae** P. Henn. Hedwigia **36**: 214. 1897.

II. Uredinia hypophyllous, round, small, 0.1–0.3 mm. in diameter, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis noticeable; urediniospores globoid, obovoid, or triangular, 19–22 by 19–24 μ; wall golden-brown, 1–1.5 μ thick, moderately echinulate, the pores 2, approximately equatorial.

III. Telia hypophyllous, round, 0.5–0.8 mm. in diameter, early naked, pulvinate, becoming somewhat pulverulent, blackish-brown, ruptured epidermis noticeable; teliospores ellipsoid, 20–26 by 32–38 μ, rounded above and below, noticeably constricted at septum; wall chestnut-brown, 1.5–2.5 μ thick, somewhat lighter and thicker above, 4–6 μ, smooth; pedicel colorless, flexuous, twice length of spore, or more commonly shorter.

ON CARDUACEAE:
Melanthera nivea (L.) Small, Guatemala.
TYPE LOCALITY: Santa Catharina, Brazil, on *Melanthera deltoidea*.
DISTRIBUTION: Central Guatemala; also in South America.

32. **Puccinia globulifera** Arth. Bot. Gaz. **40**: 200. 1905.

II. Uredinia hypophyllous, round, small, 0.2–0.3 mm. in diameter, scattered, early naked, pulverulent, cinnamon-brown, ruptured epidermis inconspicuous; urediniospores globoid, small, 15–18 μ in diameter; wall moderately thick, 2 μ, cinnamon-brown, closely and strongly echinulate, the pores 2, approximately opposite in the equator.

III. Telia amphigenous, round, small, 0.2–0.3 mm. in diameter, scattered, early naked, somewhat pulverulent, blackish, ruptured epidermis inconspicuous; teliospores broadly ellipsoid, 22–25 by 24–32 μ, semiopaque, rounded at both ends, not constricted at septum; wall dark chocolate-brown, uniformly thick, 3 μ, closely and evenly aculeate with strong, conic points; pedicel colorless except near the spore, slender, firm, 5–6 μ thick, twice length of spore or longer, the place of insertion usually at or near the septum.

ON CARDUACEAE:
Otopappus epaleaceus Pringlei Greenman, Guerrero.
TYPE LOCALITY: Iguala, Mexico, on *Otopappus epaleaceus Pringlei*.
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. N. Am. Ured. *143*.

33. **Puccinia Zaluzaniae** Arth. Bot. Gaz. **40**: 205. 1905.

II. Uredinia chiefly epiphyllous, scattered, round, small, 0.3 mm. or less in diameter;

soon naked, ruptured epidermis noticeable; urediniospores obovate, 16–21 by 23–27μ; wall golden-brown, rather thin, 1.5–2μ, sparsely and finely echinulate, the pores 2, opposite and equatorial.

III. Telia chiefly epiphyllous, scattered, very small, 0.3 mm. or less across, usually punctiform, often confluent, early naked, becoming somewhat pulverulent, blackish-brown, ruptured epidermis not conspicuous; teliospores ellipsoid, 21–27 by 39–45 μ, obtuse or rounded above, rounded or sometimes narrowed below, slightly or not constricted at septum; wall dark chocolate-brown, minutely verrucose-rugose, moderately thick, 1.5–2.5 μ, thicker above, 3–5 μ, concolorous; pedicel colorless except next the spore, firm, tapering downward, twice length of spore, lowest third noticeably roughened.

ON CARDUACEAE:
Zaluzania asperrima Schultz-Bip., Puebla.
TYPE LOCALITY: Tehuacan, Mexico, on *Zaluzania asperrima*.
DISTRIBUTION: Known only from the type locality.

34. **Puccinia nanomitra** Sydow, Monog. Ured. 1: 182. 1902.

II. Uredinia chiefly hypophyllous, scattered, round, small, 0.2–0.5 mm. in diameter, early naked, pulverulent, cinnamon-brown, ruptured epidermis noticeable; urediniospores obovate, 24–26 by 26–30 μ; wall cinnamon-brown, thin, 1–1.5 μ, finely and closely echinulate, the pores 2, opposite and equatorial.

III. Telia chiefly epiphyllous, scattered, round, small, 0.2–0.5 mm. in diameter, soon naked, blackish, pulverulent, ruptured epidermis inconspicuous; teliospores broadly ellipsoid, 26–30 by 35–42 μ, semiopaque in water, rounded at both ends, not constricted at septum; wall chocolate-brown, 3–4 μ thick, closely and moderately verrucose, thickened by a lighter colored umbo to 5–7 μ at apex and over pore of lower cell which is usually placed midway between septum and pedicel; pedicel colorless, often attached obliquely, once to twice length of spore.

ON CARDUACEAE:
Viguiera eriophora Greenman, Oaxaca.
Viguiera helianthoides H.B.K. (*V. dentata* Spreng.), Oaxaca.
TYPE LOCALITY: Oaxaca, Mexico, on *Viguiera dentata*.
DISTRIBUTION: Southern Mexico in vicinity of the type locality.
EXSICCATI: Barth. Fungi Columb. *4668;* Barth. N. Am. Ured. *1260*. .

35. **Puccinia Electrae** Dietel & Holway; Holway, Bot. Gaz. **31**: 333. 1901.

Puccinia Coreopsidis Jackson & Holway; Arth. Am. Jour. Bot. 5: 536. D 1918. Not *P. Coreopsidis* Wakefield, Au 1918.
Puccinia additicia Jackson & Holway; Arth. Bull. Torrey Club 48: 32. 1921.

II. Uredinia amphigenous, scattered or somewhat gregarious, circular or oval, 0.2–0.5 mm. across, early naked, pulverulent, dark cinnamon-brown, ruptured epidermis membranous and conspicuous; urediniospores obovoid, 20–26 by 28–32 μ; wall golden-brown, 1.5–2.5 μ thick, prominently and sparsely echinulate, the pores 2, slightly superequatorial.

III. Telia amphigenous, scattered, circular or oval, 0.2–0.8 mm. across, early naked, pulverulent, dark chestnut-brown, ruptured epidermis conspicuous; teliospores oblong or narrowly ellipsoid, 23–28 by 35–45 μ, rounded above, rounded or slightly narrowed below, slightly constricted at septum; wall dark chestnut-brown, 3–4 μ thick, slightly thickened above, 5–7 μ, strongly and sparsely verrucose; pedicel slightly tinted next the spore, otherwise colorless, firm, twice length of spore, lower third noticeably roughened.

ON CARDUACEAE:
Coreopsis mutica DC. (*C. mexicana* Hemsl., *Electra Galeottii* A. Gray), Oaxaca; Guatemala.
TYPE LOCALITY: Oaxaca, Mexico, on *Electra Galeottii*.
DISTRIBUTION: Southern Mexico and Guatemala.
EXSICCATI: Barth. N. Am. Ured. *1439;* Sydow, Ured. *2022*.

36. **Puccinia Iostephanes** Dietel & Holway; Holway, Bot. Gaz. **31**: 334. 1901.

II. Uredinia not seen; urediniospores obovoid or cuneate, 22–26 by 23–30 μ, slightly

flattened laterally; wall cinnamon-brown, rather thick, 1.5–2 μ, moderately and strongly echinulate, the pores 2, opposite and equatorial.

III. Telia amphigenous, chiefly epiphyllous, scattered, round, 0.5–1 mm. across, somewhat tardily naked, becoming pulverulent, chocolate-brown, ruptured epidermis noticeable; teliospores ellipsoid, 26–32 by 40–48 μ, rounded at both ends, slightly or not constricted at septum; wall 4–6 μ thick, of two rather distinct layers, the inner wall dark chestnut-brown, the outer wall golden-yellow, closely and moderately verrucose, thickened to 7–10 μ at apex and over pore of lower cell which is usually near the pedicel; pedicel colorless, fragile, 6–8 μ in diameter at point of attachment to the spore, often attached obliquely, once to twice length of spore, tapering and somewhat rugose below.

ON CARDUACEAE:
Iostephane heterophylla Benth., Morelos.
TYPE LOCALITY: Cuernavaca, Mexico, on *Iostephane heterophylla.*
DISTRIBUTION: Known only from the type locality.
EXSICCATI: Barth. Fungi Columb. *3849;* Barth. N. Am. Ured. *455.*

37. **Puccinia Porophylli** P. Henn. Hedwigia Beibl. **39**: 153. 1900.

II. Uredinia chiefly hypophyllous, scattered, round or oval, 0.2–0.5 mm. across, tardily naked, somewhat pulverulent, pale cinnamon-brown, ruptured epidermis noticeable; urediniospores globoid or broadly ellipsoid, 18–22 by 20–26 μ; wall pale golden-brown or nearly colorless, thin, 1.5–2 μ, very finely and closely verrucose-echinulate, the pores obscure, apparently 6–8, scattered.

III. Telia chiefly hypophyllous and caulicolous, round or oval, small, 0.2–1 mm. across, tardily naked, pulvinate, blackish, ruptured epidermis conspicuous; teliospores ellipsoid or obovoid, 22–30 by 32–45 μ, obtuse or rounded at both ends, slightly or not constricted at septum; wall chocolate-brown, thick, 2.5–3.5 μ, slightly thicker above, 4–7 μ, very obscurely verrucose-rugose when dry, appearing smooth when wet; pedicel colorless, slightly tinted next to spore, once to thrice length of spore.

ON CARDUACEAE:
Porophyllum macrocephalum DC., Hidalgo, Morelos.
Porophyllum sp., Jalisco.
TYPE LOCALITY: Caracas, Venezuela, on *Porophyllum ellipticum.*
DISTRIBUTION: Southern Mexico; also in northern South America.
EXSICCATI: Barth. N. Am. Ured. *1168.*

38. **Puccinia tageticola** Dietel & Holway; Holway, Bot. Gaz. **24**: 26. 1897.

II. Uredinia amphigenous and caulicolous, round or oval, 0.2–1 mm. across, somewhat tardily naked, pulverulent, cinnamon-brown, ruptured epidermis usually conspicuous; urediniospores ellipsoid or obovate, somewhat flattened laterally, 16–24 by 26–30 μ; wall golden-brown, thin, 1.5–2 μ, moderately and rather finely echinulate, the pores 2, equatorial.

III. Telia amphigenous and caulicolous, round or elongate, 0.5–5 mm. long, tardily naked, pulvinate, blackish, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, 26–34 by 40–50 μ, occasionally narrower and longer in caulicolous sori, rounded at both ends, slightly or not constricted at septum; wall chestnut-brown, thick, 3–5 μ, thicker above, 7–10 μ, with a broad sub-hyaline umbo; pedicel colorless, firm, usually thick-walled, twice or thrice length of spore.

ON CARDUACEAE:
Tagetes erecta L., Porto Rico.
Tagetes filifolia Lag., Jalisco, Morelos; Costa Rica.
Tagetes lucida Cav., Michoacan, Morelos.
Tagetes micrantha Cav., Mexico (state).
Tagetes microglossa Benth., Costa Rica.
Tagetes patula L. (*T. tenuifolia* H.B.K.), Aguascalientes, Jalisco, Mexico (state), Oaxaca; Porto Rico.
TYPE LOCALITY: Guadalajara, Mexico, on *Tagetes tenuifolia.*
DISTRIBUTION: Central Mexico southward through Central America, and in Porto Rico; also in South America.
EXSICCATI: Barth. N. Am. Ured. *64, 370, 1374;* Sydow, Ured. *1987.*

39. **Puccinia jaliscana** Arth. Bot. Gaz. **40**: 202. 1905.

II. Uredinia hypophyllous, round, very small, 0.1–0.3 mm. in diameter, soon naked, pale-yellowish, somewhat pulverulent, ruptured epidermis scarcely noticeable; urediniospores globoid or broadly ellipsoid, 18–24 by 20–26 μ; wall pale cinnamon-brown or nearly colorless, rather thin, 1.5–2 μ, very finely and closely verrucose-echinulate, the pores obscure, apparently 6–8, scattered.

III. Telia amphigenous, chiefly hypophyllous, round, small, 0.2–0.5 mm. in diameter, early naked, blackish, somewhat pulverulent, ruptured epidermis not conspicuous; teliospores ellipsoid, 20–24 by 30–40 μ, rounded at both ends, slightly constricted at septum, semi-opaque; wall chocolate-brown, 2.5–3 μ thick, thicker above, 4–6 μ, prominently and closely verrucose; pedicel colorless, firm, once to twice length of spore.

ON CARDUACEAE:
Porophyllum Holwayanum Greenman, Jalisco.
TYPE LOCALITY: Sayula, Mexico, on *Porophyllum Holwayanum*.
DISTRIBUTION: Known only from the type locality.

40. **Puccinia Eriophylli** H. S. Jackson, Brooklyn Bot. Gard. Mem. **1**: 246. 1918.

Uredo abdita H. S. Jackson, Mycologia **14**: 120. 1922.

II. Uredinia amphigenous and caulicolous, scattered, small, rounded, 0.3–0.6 mm. across, early naked, pulverulent, pulvinate, chestnut-brown, ruptured epidermis conspicuous; urediniospores globoid, obovoid, or oblong, 21–27 by 26–29 μ; wall chestnut-brown, 2–3 μ thick, moderately and finely echinulate, the pores 2, approximately equatorial.

III. Telia amphigenous, scattered, small, round, 0.3–0.6 mm. across, early naked, compact, pulvinate, blackish-brown, ruptured epidermis inconspicuous; teliospores ellipsoid or oblong, 18–21 by 26–30 μ, rounded at both ends, not constricted at septum; wall chestnut-brown, 2–2.5 μ thick, uniform, minutely and obscurely verrucose; pedicel colorless, deciduous.

ON CARDUACEAE:
Eriophyllum lanatum (Pursh) Forbes, Oregon.
Eriophyllum leucophyllum (DC.) Rydb., Oregon.
Eriophyllum Nevinii A. Gray, California.
Eriophyllum staechadifolium Lag., California.
Eriophyllum trifidum (Nutt.) Rydb. (*E. confertifolium trifidum* A. Gray), California.
TYPE LOCALITY: Wren, Benton County, Oregon, on *Eriophyllum lanatum*.
DISTRIBUTION: Northern Oregon to southern California.

41. **Puccinia arnicalis** Peck, Bot. Gaz. **6**: 227. 1881.

Dicaeoma arnicale Kuntze, Rev. Gen. 3^3: 467. 1898.

II. Uredinia amphigenous, chiefly epiphyllous, scattered or gregarious, sometimes confluent, round or oval, 0.2–0.5 mm. across, early naked, cinnamon-brown, ruptured epidermis conspicuous; urediniospores globoid or ellipsoid, flattened laterally, when viewed with pores in face-view, 20–26 by 26–32 μ, when pores in side-view, 16–18 by 26–32 μ; wall light chestnut-brown, moderately thick, 1.5–2 μ, very minutely and closely echinulate, appearing nearly smooth when wet, the pores 2, opposite and considerably superequatorial.

III. Telia at first epiphyllous, becoming amphigenous, in open and irregular groups 2–5 mm. across, or extending for considerable distances along petioles or midribs, often scattered, round, 0.4–0.8 mm. in diameter, early naked, becoming pulverulent, chestnut-brown, ruptured epidermis inconspicuous; teliospores ellipsoid or obovate-ellipsoid, 18–26 by 28–38 μ, rounded above, rounded or narrowed below, slightly or not constricted at septum; wall light chestnut-brown, uniformly thin, 1–2 μ, minutely and closely verrucose, the pore of upper cell often depressed half way to septum, the pore of lower cell usually about half way between septum and pedicel; pedicel colorless, very short, deciduous.

ON CARDUACEAE:
Arnica cordifolia Hook., Colorado, Oregon, Utah.

Arnica diversifolia Greene (*A. latifolia viscidula* A. Gray), California, Oregon.
Arnica latifolia Bong., Montana.
Arnica pedunculata Rydb., Utah.
Arnica rhizomata A. Nelson, Utah.
Arnica subplumosa Greene, Colorado,

TYPE LOCALITY: Colorado, on *Arnica cordifolia*.

DISTRIBUTION: Mountains of Colorado to central California, and northward to northwestern Montana and Oregon.

EXSICCATI: Clements, Crypt. Form. Colo. *546;* Ellis & Ev. Fungi Columb. *1846;* Garrett, Fungi Utah. *25, 26, 27;* Sydow, Ured. *1906, 1907.*

42. **Puccinia Trixitis** (Kern & Kellerm.) Arth. Am. Jour. Bot. **5**: 534. 1918.

Uredo Trixitis Kern & Kellerm. Jour. Myc. **13**: 26. 1907

II. Uredinia hypophyllous, scattered, round or oval, 0.3–1 mm. across, early naked, pulverulent, dark chestnut-brown, ruptured epidermis conspicuous; urediniospores globoid or broadly ellipsoid, 21–26 by 24–31 μ; wall dark cinnamon- or light chestnut-brown, 1.5–3 μ thick, sparsely or moderately echinulate, the pores 2, approximately equatorial.

III. Telia hypophyllous, scattered, round or oval, 0.2–0.8 mm. across, early naked, compact, chestnut-brown, ruptured epidermis conspicuous; teliospores ellipsoid or oblong, 16–21 by 29–45 μ, rounded above, slightly narrowed below, constricted at septum; wall cinnamon-brown, 1–2 μ thick, thickened above, 4–7 μ, smooth; pedicel colorless, up to one and a half times length of spore.

ON CARDUACEAE:
Trixis frutescens P. Br., Guatemala.
TYPE LOCALITY: San Lucas, Solola, Guatemala, on *Trixis frutescens*.
DISTRIBUTION: Central Guatemala.

43. **Puccinia Onopordi** Sydow, Monog. Ured. **1**: 128. 1902.

II. Uredinia amphigenous and caulicolous, round or oval, small, 0.2–1 mm. across, somewhat tardily naked, pulverulent, light cinnamon-brown, ruptured epidermis usually noticeable; urediniospores globoid or ellipsoid, 23–26 by 26–32 μ; wall cinnamon-brown, 2 μ thick, rather closely and finely echinulate, the pores 3, approximately equatorial.

III. Telia amphigenous and caulicolous, round or oval, small, 0.2–1 mm. across, somewhat tardily naked, pulvinate, becoming somewhat pulverulent, chestnut-brown, ruptured epidermis usually noticeable; teliospores broadly ellipsoid or oblong, 22–26 by 32–48 μ, rounded above and below, slightly or not constricted at septum; wall thin, 1–1.5 μ, dark cinnamon-brown, sometimes slightly thickened over pore of each cell, 3–4 μ, very finely verrucose, appearing almost smooth when wet; pedicel colorless, fragile, equaling spore or shorter.

ON CARDUACEAE:
Onopordon Acanthium L., Nova Scotia.
TYPE LOCALITY: Aintab, Syria, on *Onopordon Carduncul*us.
DISTRIBUTION: Nova Scotia; also in southwestern Asia.

DOUBTFUL OR EXCLUDED SPECIES

PUCCINIA BULLARIA Schw. Trans. Am. Phil. Soc. II. **4**: 296. 1832. (Not *P. Bullaria* Link, 1825.) This fungus is on *Hyssopus nepetoides*, and may be the early stage of some ascomycete.

PUCCINIA FURFURACEA Ellis & Gall. Incidentally mentioned by Dietel (Hedwigia **37**: 202. 1898) as from Mexico; doubtless a hyponym.

PUCCINIA INCARCERATA Lév., reported from Cuba, on petioles of *Cissus*, probably belongs to the *Ustilaginaceae*, and is usually recorded as *Mycosyrinx Cissi* (DC.) G. Beck.

COMPLETED VOLUME

9: i–iv, 1–542. (Agaricales:) Polyporaceae (pars), Boletaceae, Agaricaceae (pars). Complete in 7 parts.

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6[1]: 1–84. Phyllostictales: Phyllostictaceae (pars).

7[1]: 1–82. Ustilaginales: Ustilaginaceae, Tilletiaceae. **7**[2]: 83–160. Uredinales: Coleosporiaceae, Uredinaceae, Aecidiaceae (pars). **7**[3]: 161–268. Aecidiaceae (pars). **7**[4]: 269–336. Aecidiaceae (pars). **7**[5]: 337–404. Aecidiaceae (pars). **7**[6]: 405–480. Aecidiaceae (pars). **7**[7]: 481–540. Aecidiaceae (pars).

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16[1]: 1–88. Ophioglossales: Ophioglossaceae. Marattiales: Marattiaceae. Filicales: Osmundaceae, Ceratopteridaceae, Schizaeaceae, Gleicheniaceae, Cyatheaceae (pars).

17[1]: 1–98. Pandanales: Typhaceae, Sparganiaceae. Naiadales: Zannichelliaceae, Zosteraceae, Cymodoceaceae, Naiadaceae, Lilaeaceae. Alismales: Scheuchzeriaceae, Alismaceae, Butomaceae. Hydrocharitales: Elodeaceae, Hydrocharitaceae. Poales: Poaceae (pars). **17**[2]: 99–196. Poaceae (pars). **17**[3]: 197–288. Poaceae (pars).

21[1]: 1–93. Chenopodiales: Chenopodiaceae. **21**[2]: 95–169. Amaranthaceae. **21**[3]: 171–254. Allioniaceae.

22[1]: 1–80. Rosales: Podostemonaceae, Crassulaceae, Penthoraceae, Parnassiaceae. **22**[2]: 81–192. Saxifragaceae, Hydrangeaceae, Cunoniaceae, Iteaceae, Pterostemonaceae, Hamamelidaceae, Altingiaceae, Phyllonomaceae. **22**[3]: 193–292. Grossulariaceae, Platanaceae, Crossosomataceae, Connaraceae, Calycanthaceae, Rosaceae (pars). **22**[4]: 293–388. Rosaceae (pars). **22**[5]: 389–480. Rosaceae (pars). **22**[6]: 481–560. Rosaceae (pars).

24[1]: 1–64. (Rosales:) Fabaceae (pars). **24**[2]: 65–136. Fabaceae (pars).

25[1]: 1–88. Geraniales: Geraniaceae, Oxalidaceae, Erythroxylaceae, Linaceae. **25**[2]: 89–171. Tropaeolaceae, Balsaminaceae, Limnanthaceae, Koeberliniaceae, Zygophyllaceae, Malpighiaceae. **25**[3]: 173–261. Rutaceae, Surianaceae, Simaroubaceae, Burseraceae.

29[1]: 1–102. Ericales: Clethraceae, Monotropaceae, Lennoaceae, Pyrolaceae, Ericaceae.

32[1]: 1–86. Rubiales: Rubiaceae (pars). **32**[2]: 87–158. Rubiaceae (pars).

33[1]: 1–110. Carduales: Ambrosiaceae, Carduaceae (pars).

34[1]: 1–80. (Carduales:) Carduaceae (pars). **34**[2]: 81–180. Carduaceae (pars). **34**[3]: 181–288. Carduaceae (pars).

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